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PROTOTYPE IMAGE SPECTRUM ANALYZER (PISA) FOR CARTOGRAPHIC FEATU--ETC(U)

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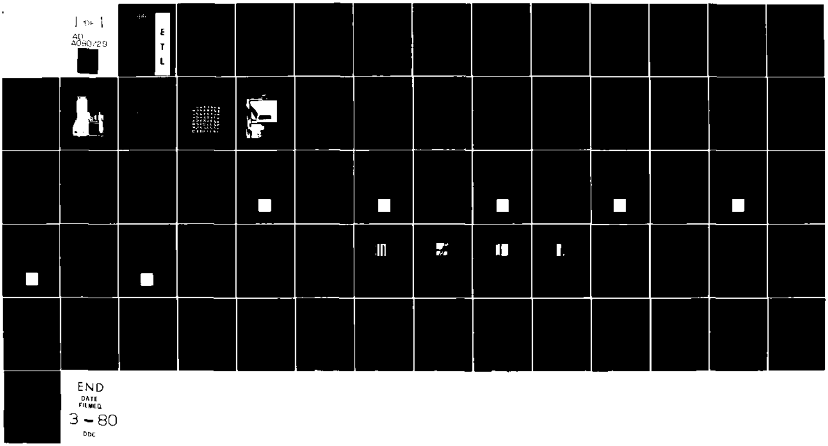

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Prototype image spectrum analyzer (PISA) for cartographic feature extraction

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Fredrick W. Rohde

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OCTOBER 1979

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An electro-optical system for obtaining two-dimensional Walsh transforms of cartographic images was developed. The system uses a plasma discharge device to generate visible two-dimensional Walsh function pattern masks. The cartographic imagery is placed in contact with the plasma tube, and the product of the mask and image is integrated with a single photodetector. The system is capable of producing 512 by 512 (262, 144), two-dimensional Walsh functions, and the same number of associated Walsh transform coefficients in about 14 seconds. The quantitative measurement and display of the relative magnitude of the first block of Walsh transforms (64 x 64) was facilitated with a system minicomputer and a CRT display. A set of selected cartographic images

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and targets were used to evaluate the system. It was discovered that most of the significant transform information appeared in the lower order Walsh transform coefficients, and further that each Walsh transform pattern is unique in itself and can be distinguished from the others for a limited set of well defined inputs. The dynamic range, the temporal response, and the symmetry of responses of the Prototype Image Spectrum Analyzer (PISA) were found to be relatively poor.

PREFACE

This work was authorized by the U.S. Army Engineer Topographic Laboratories, Fort Belvoir, Virginia under DA Project–Task Area Work Unit No. 4A161102B52C entitled "Electronic Image Analysis for Feature Extraction."

COL Daniel L. Lycan, CE, was Commander and Director of ETL during the report preparation.

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PROTOTYPE IMAGE SPECTRUM ANALYZER (PISA) FOR CARTOGRAPHIC FEATURE EXTRACTION

INTRODUCTION

The transformation of complex signals into relatively simple and compact forms has been widely employed in such fields as communication, coding, etc. Normally, the well-known Fourier technique is used with either digital computers or laser optics as the means of transformation. In this report, a technique for obtaining transforms of topographic images based on discrete function technology is presented. An electro-optical system capable of producing Walsh transforms of topographic images is described. The heart of the system is a plasma discharge device that generated visible Walsh function patterns as masks to be multiplied by the input imagery. The cartographic imagery is placed in contact with the plasma tube, and the light energy transmitted through the imagery (transparency) is integrated with a single photo-detector and processed to become Walsh transforms. The generation of Walsh functions, the method of plasma tube-driving, the technique of signal processing, and the display of the quantitative transform coefficients are addressed. The system test and evaluation results using a selected set of topographic feature images and targets are discussed. Finally, conclusions are presented.

SYSTEM DESCRIPTION

The PISA system consists of a two-dimensional, digital, Walsh function generator; a plasma discharge device with drivers, a lens, and photomultiplier; an analog coefficient processor; a minicomputer with a CRT terminal; a CRT display unit; and a line printer as shown in figure 1.

The two-dimensional Walsh functions of order up to 512 by 512 were generated by the Walsh function generator. The plasma tube is driven by the Walsh function generator through the tube drivers to generate visible, two-dimensional Walsh function patterns as a light source. The plasma tube has a light-emitting surface of approximately 8.5 by 8.5 inches, and 512 electrodes in both X, and Y directions. The topographic

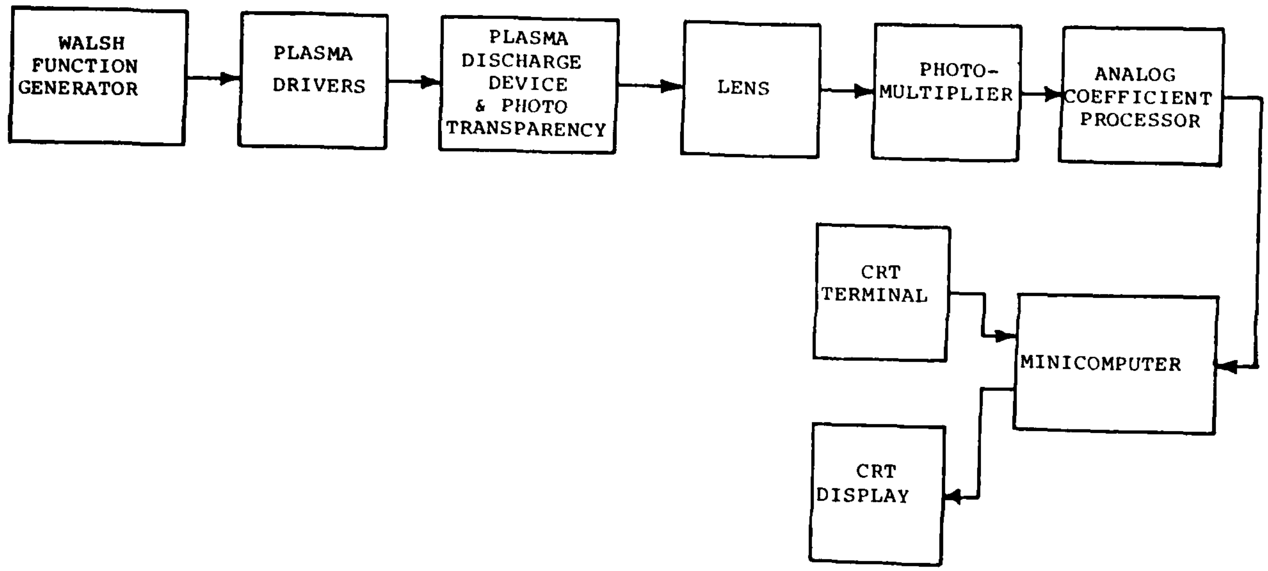

FIGURE 1. System Block Diagram.

imagery was placed in direct contact with the light–emitting surface of the plasma tube, and the light energy transmitted through the imagery was collected by a lens and integrated by a photomultiplier. The output of the photomultiplier was processed by an analog coefficient processor to become Walsh transforms. The first 64 by 64 orders of the Walsh transform coefficients were further processed and manipulated by a minicomputer to provide quantitative measurement and display of relative magnitude. The quantitative measurement of transform coefficients was printed by a line printer and also displayed by a CRT monitor unit. The experimental set–up is shown in figure 2.

PLASMA DISCHARGE DEVICE AS VISIBLE PATTERN GENERATOR

The heart of the system is the Digivue–512 plasma discharge tube. The construction of the plasma tube is shown in figure 3. The tube consists of 512 X–directional electrodes and 512 Y–directional electrodes sandwiching a neon gas. The tube has a total light–emitting surface of approximately 8.5 by 8.5 inches. When the proper voltage is applied across an X electrode and a Y electrode by the plasma tube drivers, the neon gas discharges producing a small light at the intersection of the electrodes. For our case, the minimum discharge voltage difference between two electrodes is 250 volts. By properly addressing both X– and Y–directional electrodes with a two–dimensional Walsh function generator, visible two–dimensional Walsh function patterns of order up to 512 by 512 can be generated in any sequence. For our system, the Walsh function generator was designed to produce Walsh patterns of the following sequence: Wal(0, 0), Wal(0, 1), Wal(0, 2), . . . , Wal(0, 511), Wal(1, 0), . . . , Wal(2, 0), . . . , Wal(511, 511). The maximum switching rate of this plasma tube is 50 kHz (kilohertz); however, the tube is refreshed every 33 μs (microseconds). In the automatic running mode, the tube at the present time is switched at a relatively slow rate because of the I/O (Input/Output) time restriction of the system's minicomputer. Repeated Walsh function patterns can also be produced in a manual switching mode with a push button switch for inspection and demonstration purposes. The first 8 by 8 lower order, two–dimensional Walsh function patterns are shown in figure 4. The black areas represent that the plasma light is on, and the white, is off. Figure 5 represents the plasma tube that is lighted with a two–dimensional Walsh pattern.

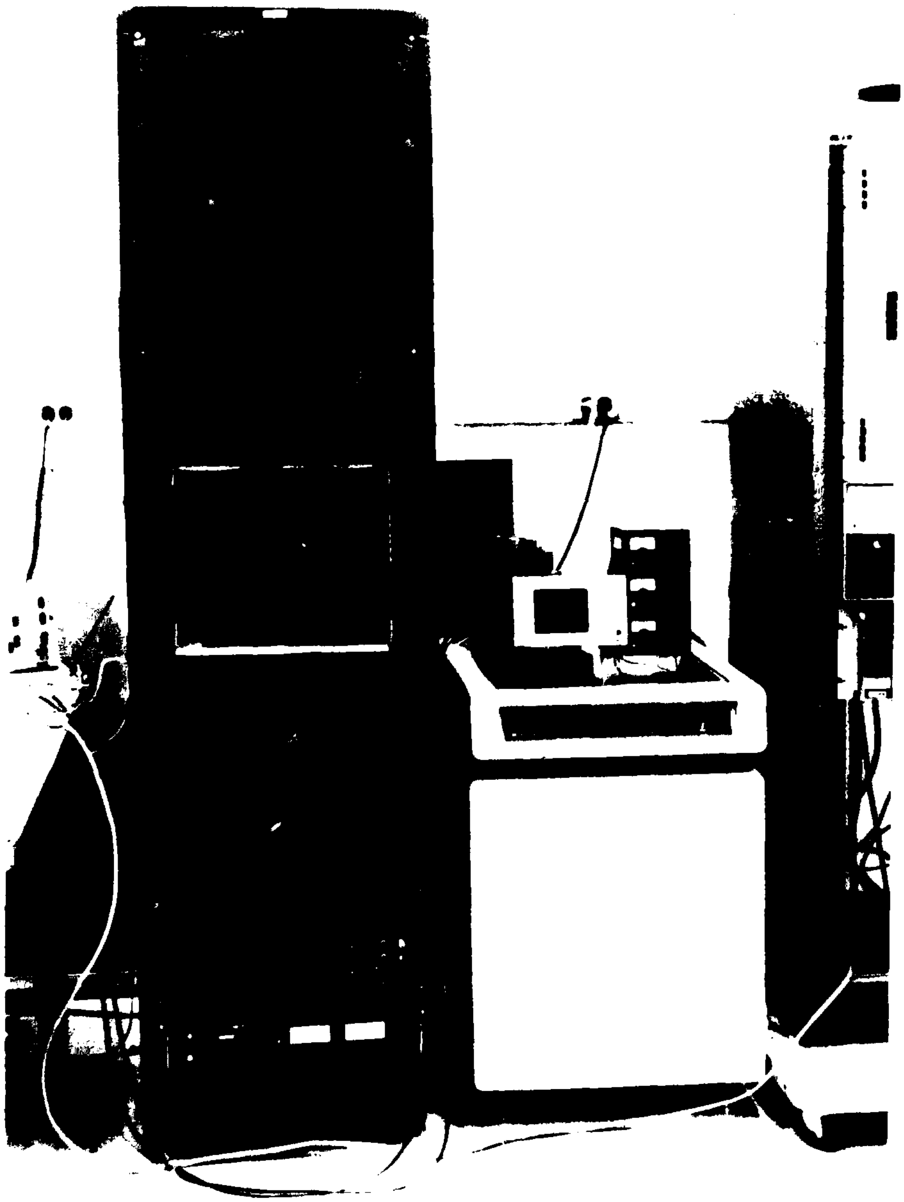

FIGURE 2. Experimental Set-Up.

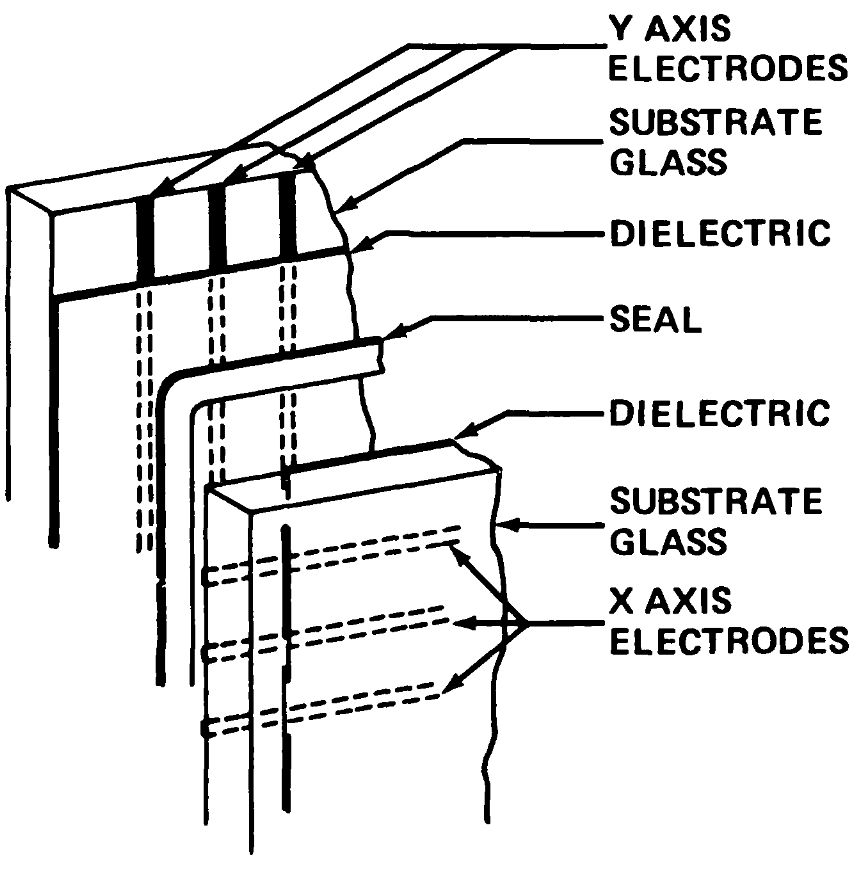

FIGURE 3. Construction of the Plasma Tube.

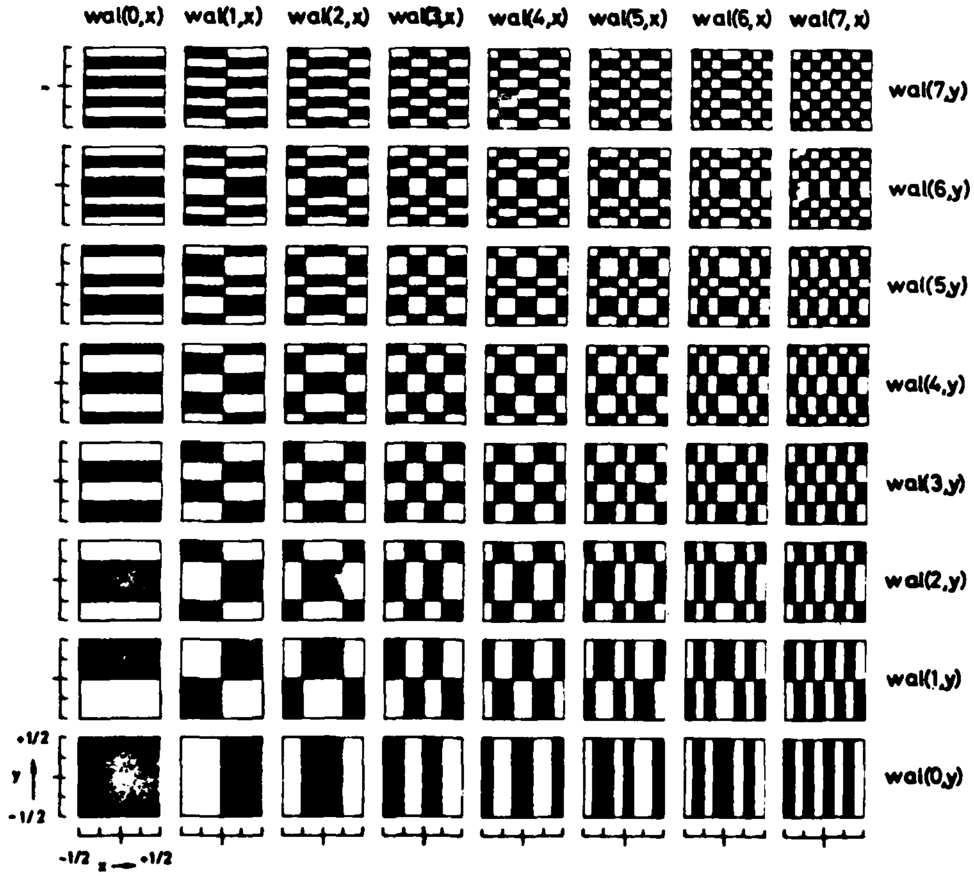

FIGURE 4. First 8 by 8, Lower Order, Two-Dimensional Walsh Functions.

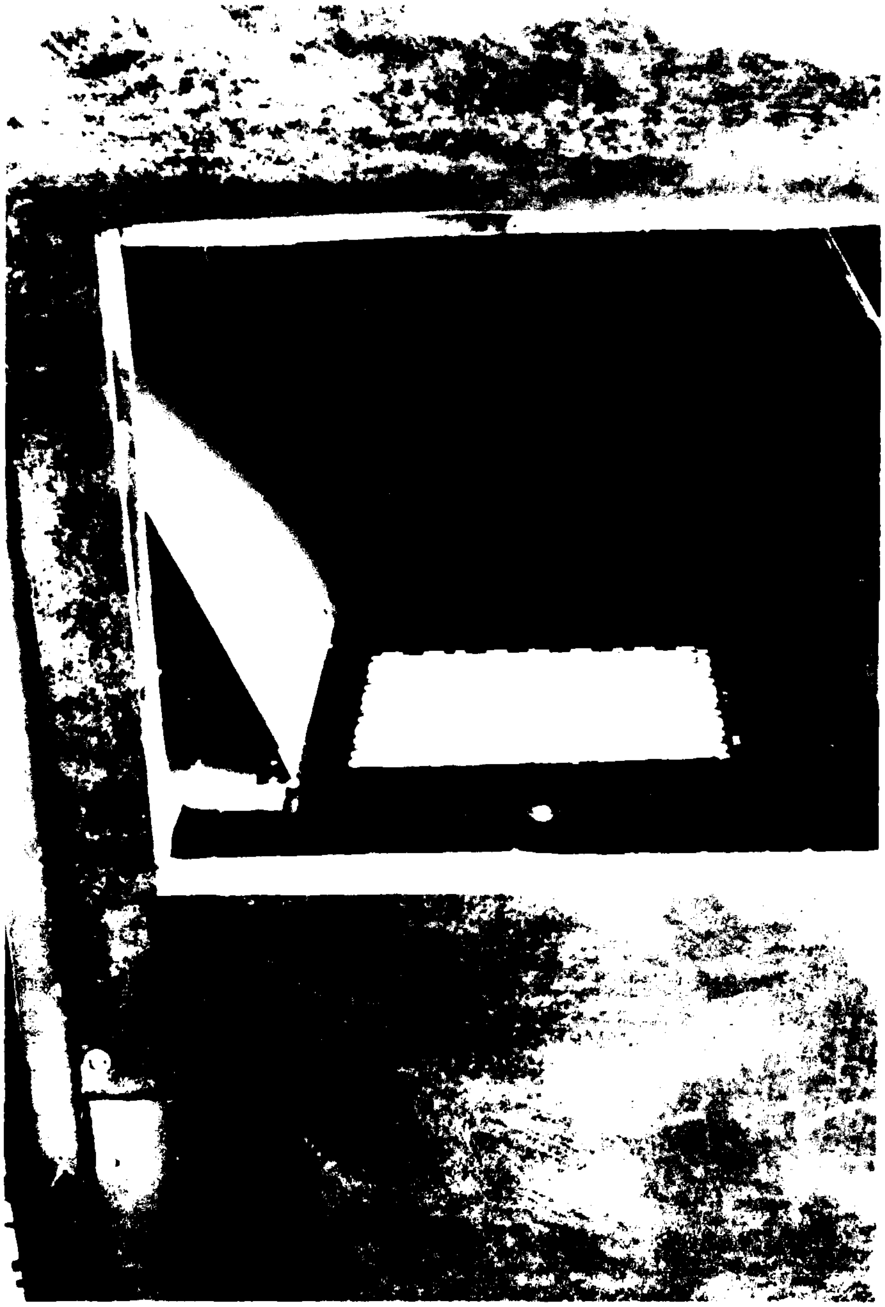

FIGURE 5. A Walsh Pattern Generated by the Plasma Tube.

TWO–DIMENSIONAL WALSH FUNCTION GENERATOR

The Walsh Function Generator (WFG) consists of a master counter board and groups of Walsh function generator logic, which are organized on 16 plasma tube driver boards for ease of accessing all the plasma tube electrodes. The master counter board is shown in figure 6. The master counter is the system hardward controller. It contains most of the control logic that the operator interfaces with when operating the system, as well as containing the system clock, an 18–bit binary counter chain, and a small amount of Walsh function generator logic. The counter chain develops all of the strobes, 1X . . .9X, and 1Y . . .9Y. The chain is made up of five(74193)synchronous 4–bit up/down binary counters wired in tandem. The first three strobes (1X, 2X and 3X) from the chain (chip S26) are decoded through exclusive or (7486) gates S17 and S18 to produce a Walsh function code 3Xa . . . 3Xh. Each one of these codes goes to a different plasma tube driver board. The next six strobes from the counter chain (4X . . . 9X) go to every X–axis plasma tube driver board. These six strobes are purely binary in nature. Chips S3 and S10 are buffer chips to increase the line–driving capability. The same sequence of strobes are repeated for the Y–axis 3Ya . . . 3Yh, 4Y . . .9Y. The only difference is that the Y–strobes are higher up on the counter chain. They start with the 10th bit of the chain; therefore, for every time a Y–strobe changes, the X–strobes go through all 512 possible combinations.

The counter chain is driven by the system clock. This circuitry consists of a Motorola, 256 kHz, crystal oscillator IC with a TTL compatible output. The output is fed into a binary counter (74193), S12, and divided by 16 to yield a 16 kHz signal. The 16 kHz clock is connected to the 18–bit counter chain control logic through the automatic/manual mode switch on the control panel. The clock also directly drives the X-Walsh function generator logic (driven by the clock signal) and the Y–Walsh function generator logic (driven by the complement of the clock signal). The control logic does four jobs. Through the control panel switches, the operator is able to (1) Start the counter, (2) Reset the counter, (3) Put the counter in automatic (clock–driven) mode, or (4) Put the counter in manual (switch–driven) mode. The counter–enable switch on the control panel interfaces the master counter board at P1. Grounding this switch fires the one–shot (74121) S23, the output, $\bar{Q}$, goes low and sets the output of the RS flip–flop, S21, to a high at S21–6, enabling the strobe to appear at S21–2. This enables the clock to pass through S21 at S21–3 and drive the counters through the S15 gates. When the counter chain ripples completely through, it resets itself through the inverter (7404) S22 by resetting the RS flip–flop at S21–10. This locks out the clock at S21–1. The RS flip–flop may also be reset by the counter reset switch on the control panel through chip S5 and pin P25. the manual counter switch on the control panel enables the operator to step the counter through its states (manually) one at a time. The connection is made at P27 and P28, and the SPST switch switches the states of the RS flip–flop, S5. This toggles the counter when the correct paths in the intervening control logic are opened.

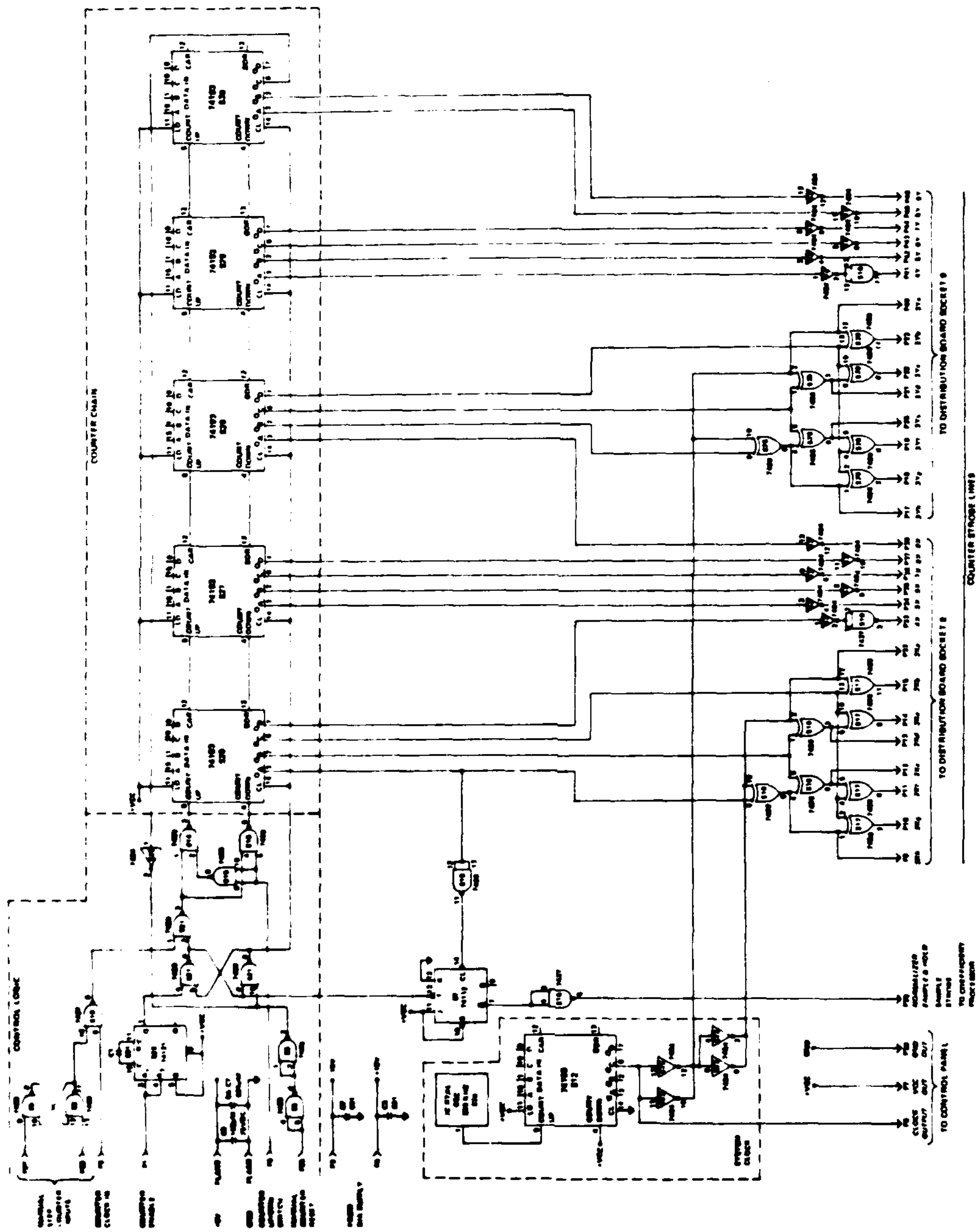

FIGURE 6. Master Counter and Lower Order Walsh-Function Generator.

The X and Y scanning for the display of transform coefficients are provided by the system computer at 30–frames–per–second rate to avoid the smear of the displayed pattern using a single frame storage display monitor.

As mentioned before, the high orders Walsh function generator logic circuits are physically built on 16 plasma tube driver cards. They are shown in figure 7. Inputs to these circuits are from the counter strobe lines through the distribution board socket. The distribution scheme is not included in this report.

PLASMA TUBE DRIVERS

The high–voltage plasma tube driver is a sourcing and sinking type switch circuit (see figure 7). Current is sourced through Q1 and Q2 and sunk through Q3 and Q4. The transistor used is an MPSA42, which is a high–voltage (300VDC), NPN switching type. It is also able to handle 1/2 W Power. The most critical requirement of this circuit is that both sourcing and sinking halves of the circuit must never be "on" at the same time. If they should be "on" together for any amount of time, the circuit will over heat. The .0022μF (microfarad) capacitor in the emitter circuit of Q3 delays the base–to–emitter junction from reaching 0.7 VDC and thereby turning Q4 "on," this ensures that Q1 and Q2 will be "off" by the time Q4 does come "on." In the other direction, when Q3 is going "off" and the input drops to between 1.4 and 0.7 VDC, Q3 is still "on" acting like an emitter–follower and Q1 is still "off," but Q4 has gone "off" already, eliminating the problem associated with the two halves of the circuit being "on" at the same time. The rise and fall times of the circuit are adequate, 3 to 4 μs. The Darlington configurations, Q3, Q4, Q1, and Q2 are used for current gain. There is approximately 0.6 VDC noise immunity between Q4 V_{BE} + Q3 V_{CE} and Q1 V_{BE} + Q2 V_{BE}. This level is adequate for system noise immunity. The output changes from 0 to +3.5 VDC.

The plasma display can be thought of as a tube containing 512 neon lights, one at each X– and Y–electrode intersection. Electrically, the tube is a capacitor, i.e. there is a dielectric covering the X and Y electrodes. This means that the tube must be refreshed, or run dynamically. The unit in this system is refreshed at a 33 kHz rate. The firing voltage on the tube is about 250 VDC. This is accomplished by switching the intersecting electrodes to opposite polarities by 125 VDC each. In other words, one electrode goes down 125 VDC while the other electrode goes up 125 VDC, thereby causing the capacitive plasma tube to see a 250 VDC change because of its capacitive characteristic.

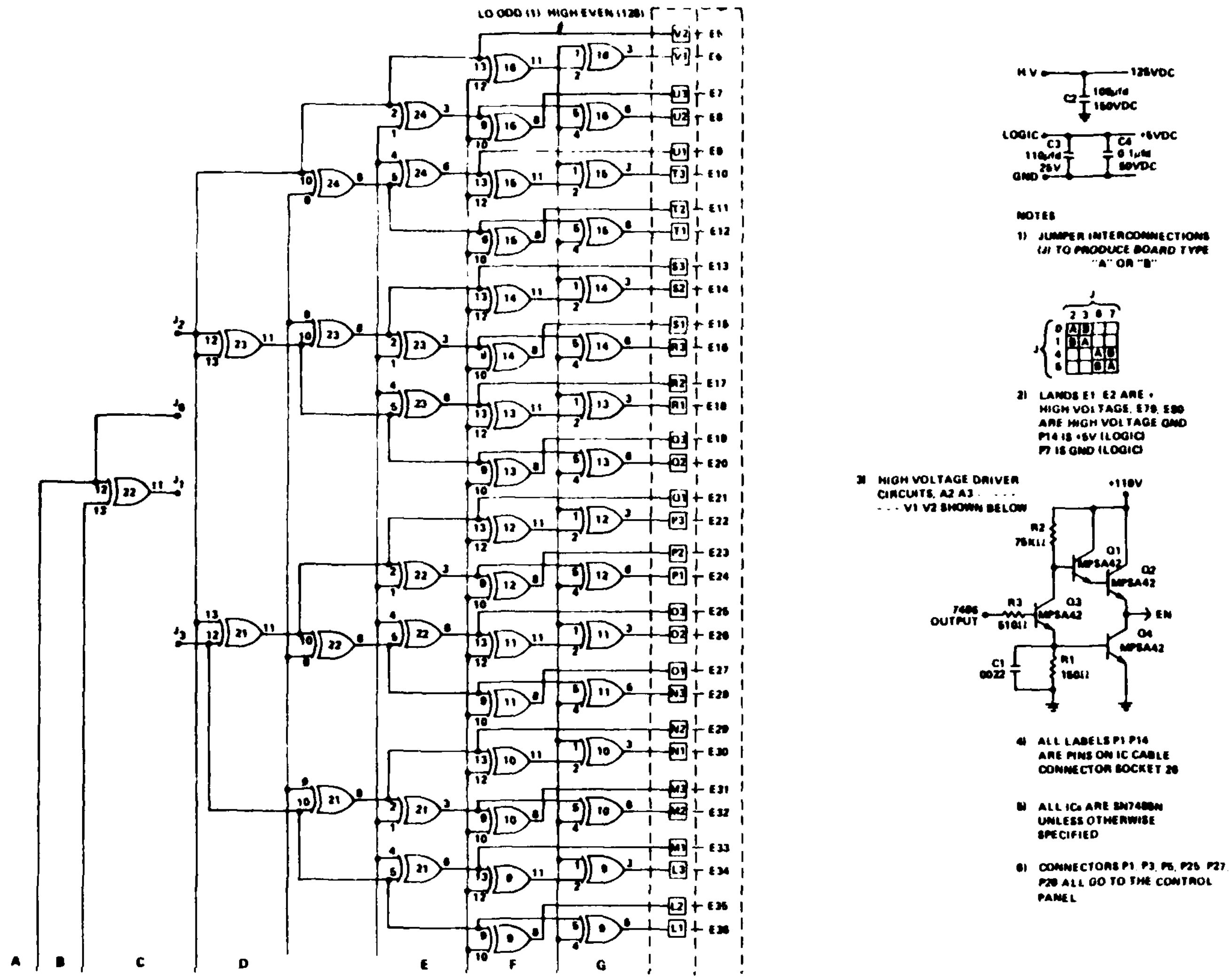

FIGURE 7. Higher Order Walsh–Function Generator and Plasma Tube Drivers.

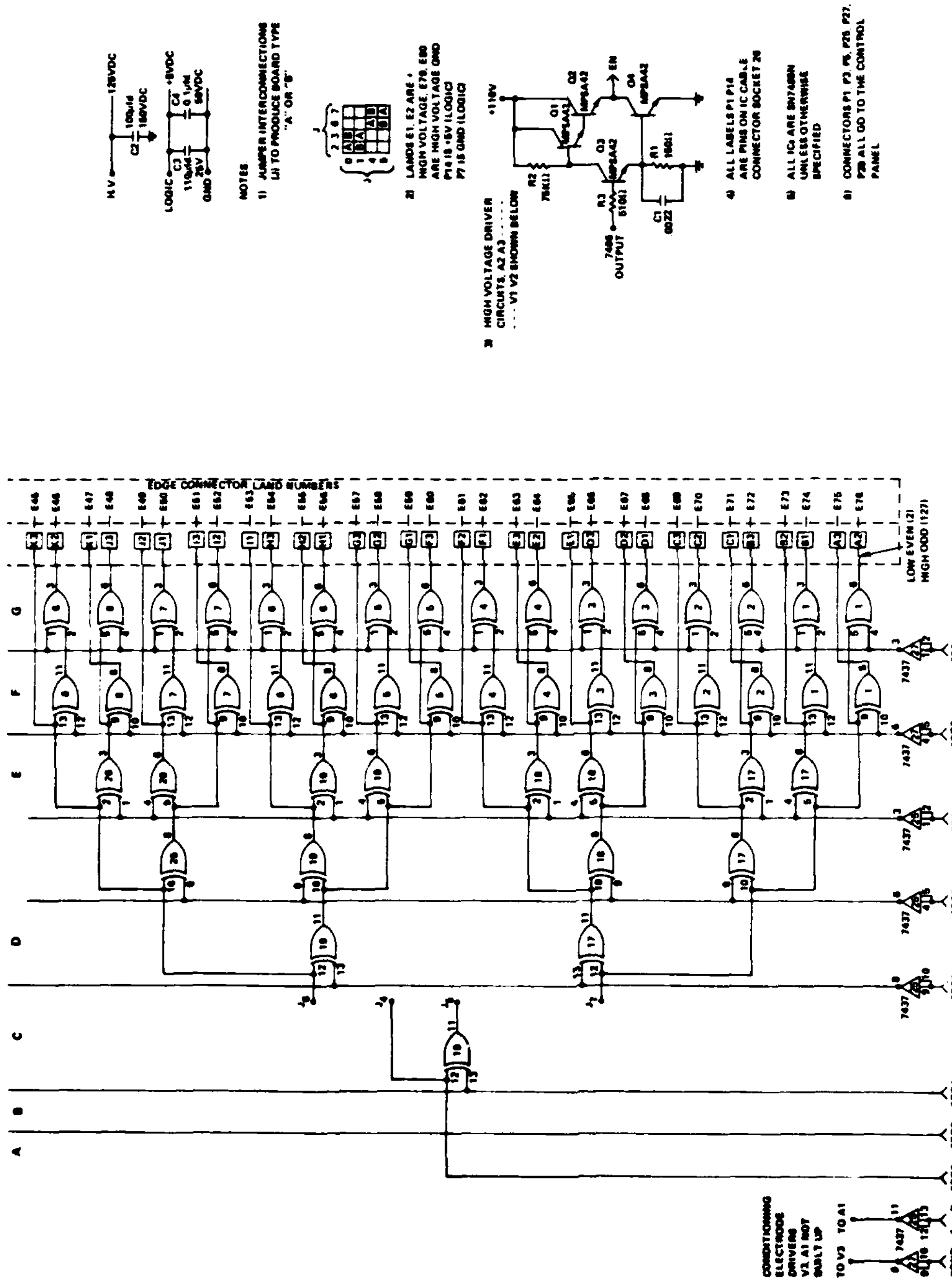

FIGURE 7. Continued.

OPTICAL PATH AND LIGHT SENSING AND LIGHT CONVERSION

The optical path is straight forward. It consists of a lens mounted one focal-length away and centered over the plasma tube. The photomultiplier tube is positioned on the other side of the lens. This configuration enables the lens to diffuse the light collected from the plasma tube over the whole photosensitive area of the photomultiplier tube anode, canceling out the effects of sensitivity variations across the surface of the anode. The photomultiplier tube (6199) integrates the light passing through the image from the Walsh function mask, thus producing one Walsh coefficient for each mask. The photomultiplier tube's supply voltage is approximately 600 VDC. This voltage is generated by a Venus C23 high-voltage converter powered on a 5 VDC primary, as shown in figure 8. The cathode is held at –600 VDC while the photon acceleration elements are supplied through taps on a 1.5 meg Ω resistor chain (R1. . .R11). Capacitors C2 through C4 are used to help hold constant voltage on the acceleration pins when a pulsed light input is used.

ANALOG COEFFICIENT PROCESSOR

The analog coefficient processor circuit consists of a Walsh coefficient sample and hold, a difference amplifier, and a buffer amplifier, as shown in figure 8. The sample and hold, H1, holds the Walsh coefficient signal. The Walsh coefficient signals are narrow (3 to 4 μs) negative pulses produced by each of the higher order Walsh functions. Special sampling one-shot circuits, S2a and S2b, are used to form and position the Walsh coefficient sample-and-hold pulse so that it occurs exactly coincident with the maximum Walsh coefficient signal. Circuit S2a is triggered by the positive edge of the system clock, and R14 adjusts the width of its output pulse from 3 to 40 μs. The negative-going edge of the output of S2a triggers the pulse from S2b, thereby enabling one to adjust the position of this narrow (4 μs) sampling pulse along the whole clock cycle by adjusting R14. The peak amplitude level of each Walsh coefficient signal is held in the sample and hold until the next sample. The droop is about 100 μV (microvolts). Signal levels from the sample and hold is fed into the negative input of A1, the LM301 difference amplifier. Originally, a normalization signal is fed to the positive input of this difference amplifier. However, because of poor performance of this circuitry, the normalization task was redesigned to be done by the system minicomputer, and the difference amplifier is used as an ordinary amplifier. The LM318 buffer amplifier, A2, is used to enable some adjustment of the output voltage before it is fed into the interface electronics of the system computer.

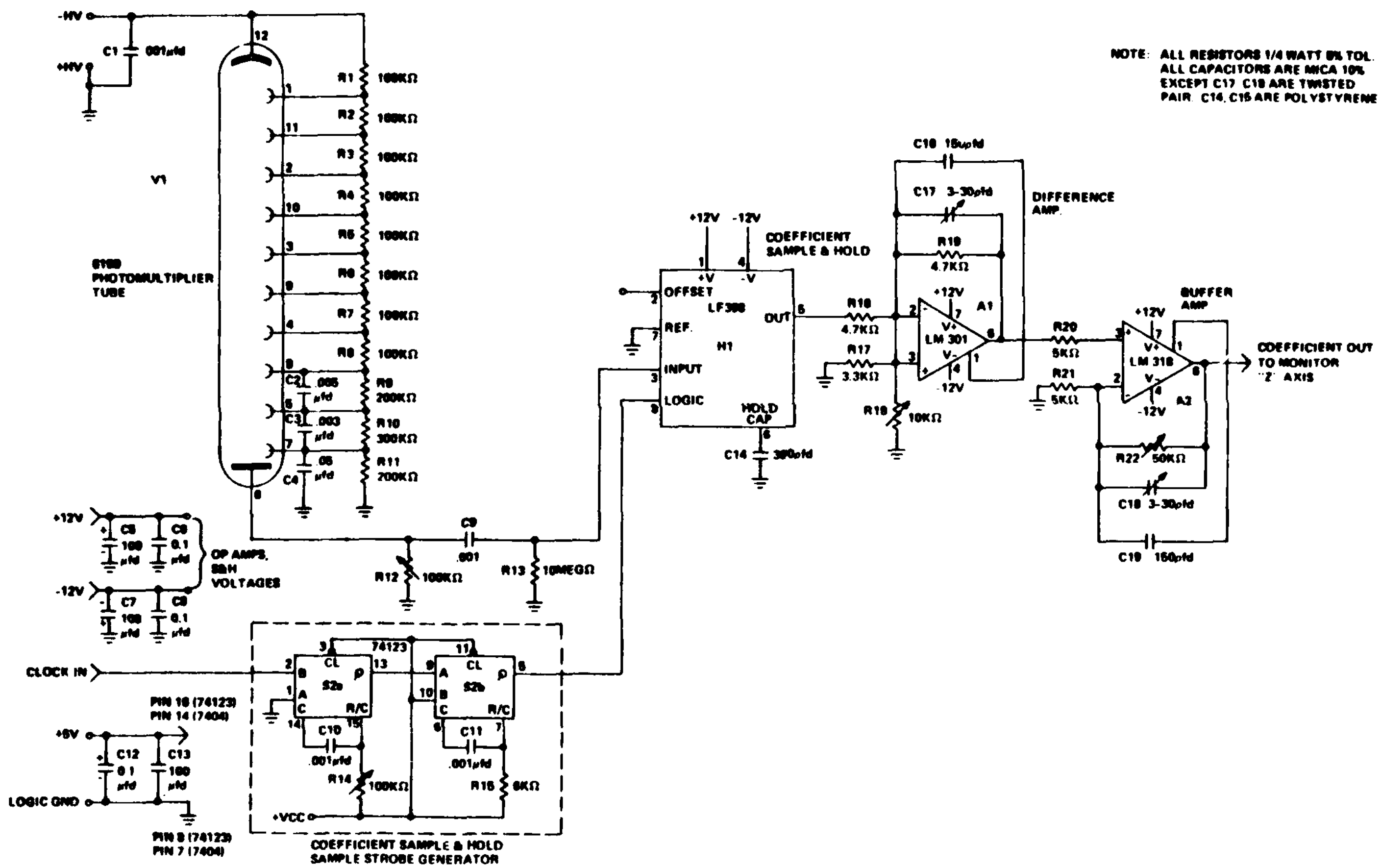

FIGURE 8. Photomultiplier Tube and Analog Coefficient Processor.

CONTROL PANEL

The control panel itself consists of one push--button switch, three toggle switches, and five 2 KΩ, 1/4 W, 5% resistors, as shown in figure 9. The required position of each of the four control panel switches as a function of the system operating mode is shown in table 1.

TABLE 1. SYSTEM--OPERATING MODE AS A FUNCTION OF THE POSITION OF THE CONTROL SWITCHES

Name of Switch	System Operating Mode		
	Automatic Running	Reset	Manual Step
Enable Counter	On	Off	On
Manual Counter Reset	Off	On	Off
Manual/ Automatic Mode	Automatic	N/A	Manual
Manual Step	N/A	N/A	Activated

Currently, the counter reset and counter enable in automatic mode are controlled by the system minicomputer. Two coxial cables are connected from these two switches to the interface electronics, and then to the system's minicomputer as shown in figure 9.

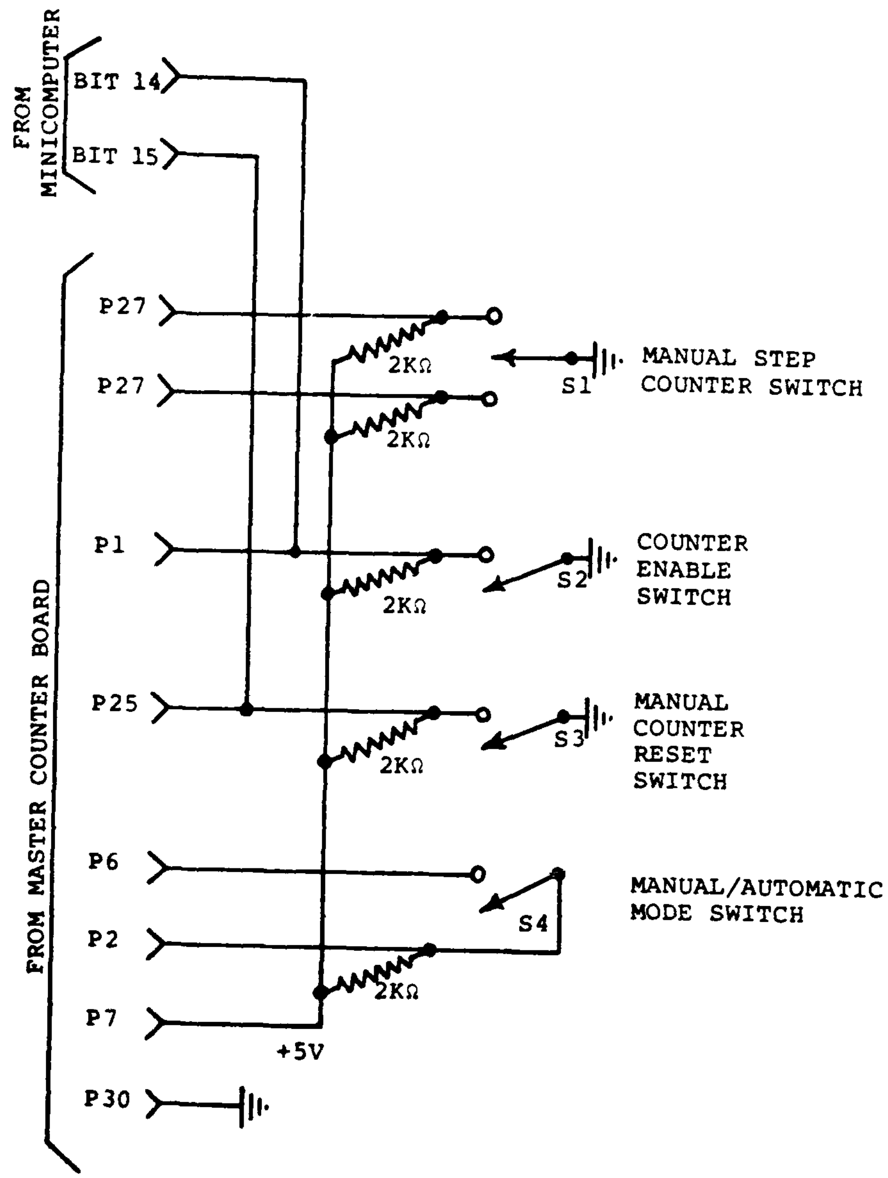

FIGURE 9. Control Panel

INTERFACE ELECTRONICS FOR SYSTEM MINICOMPUTER

To obtain quantitative measurement of the Walsh transform coefficients, one must process the output of the Analog Coefficient Processor by the system mini-computer. The interface electronics was designed to convert the analog signal representing the relative magnitude of the transform coefficients into a 6–bit digital signal for input to the HP 2108 minicomputer. The interface electronics is shown in figure 10. The square wave clock from PISA is shaped and delayed by two 74121 monomultivibrators and used as the trigger input to the MP2712C analog–to–digital converter. The output of the analog coefficient processor is amplified one to two times by an μA715 operational amplifier before going to the analog input of the analog–to–digital converter. The converter has a 12–bit capability, but only the most significant 6 bits are used. These 6 bits are buffered by the quad NAND (7437) gates. The end–of–conversion signal from the analog–to–digital converter is also buffered and supplied to the minicomputer.

SYSTEM'S MINICOMPUTER AND SOFTWARE FUNCTIONS

An HP 2108 minicomputer was used to provide quantitative measurement and display of the relative magnitude of the Walsh transform coefficients. The computer is also used to control and initiate the system when it is operated in the automatic running mode. The following functions are performed by the system minicomputer:

1. Inputs first 64 by 64 lower order Walsh transform coefficients into memory.
2. Computes the lowest coefficient A(0, 0) as twice the average of all coefficients.
3. Scales coefficients into the range of 0 to 99.
4. Computes actual coefficients by subtracting 1/2 A(0, 0) from each coefficient.
5. Passes coefficients through a variable valued threshold gate.
6. Provides repeated x, y scanning signals to a CRT monitor set and displays the absolute value of the coefficients after threshold.
7. Scales coefficients for display.

The software developed to execute the above tasks is shown in the appendix.

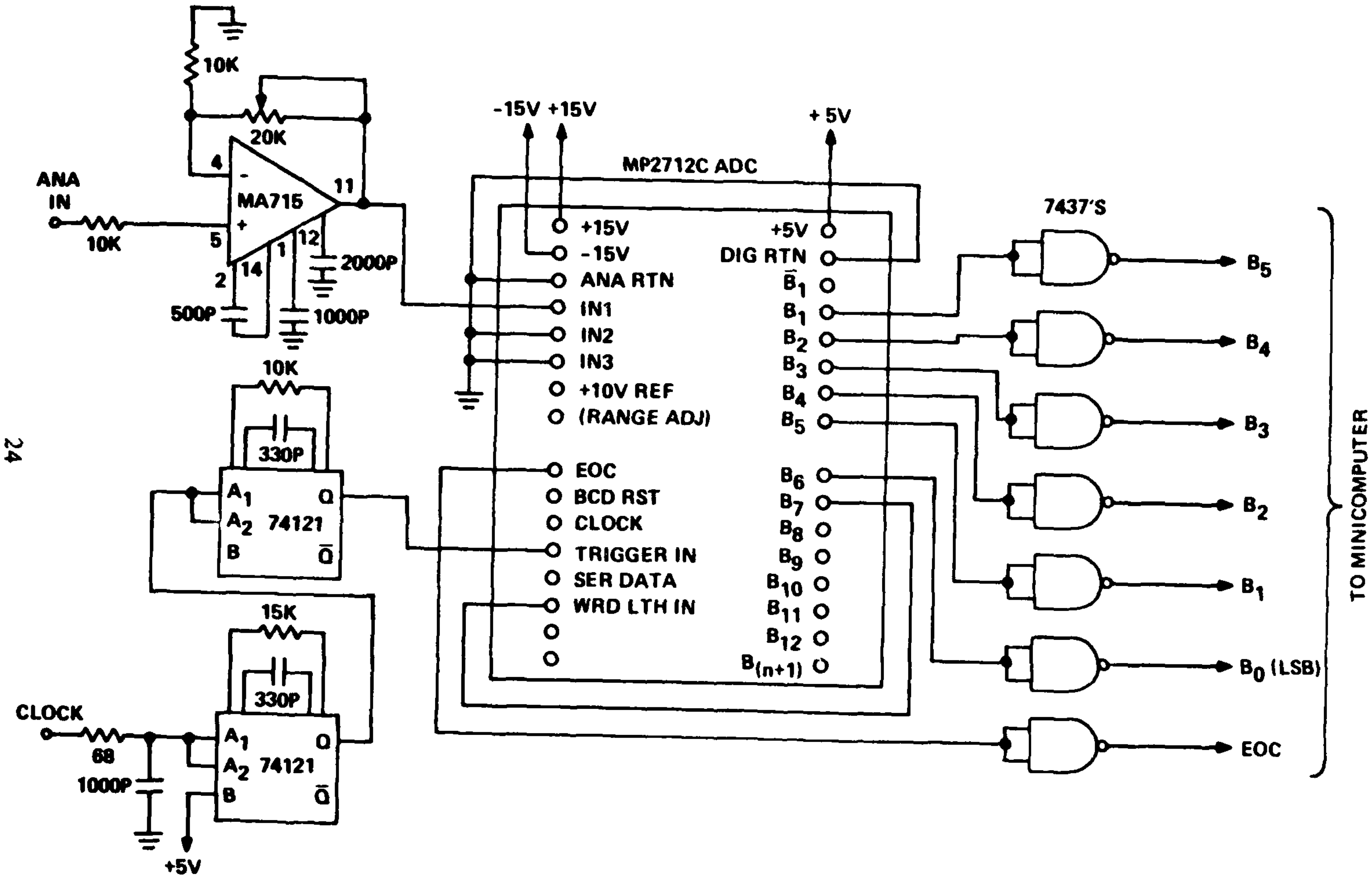

FIGURE 10. Interface Electronics for System Minicomputer.

SYSTEM TEST RESULTS AND DISCUSSIONS

A selected set of targets representing manmade topographic features, such as road intersections, straight line roads and buildings, together with aerial photo--transparencies containing roads and farm lands, and four lower order Walsh function patterns were used as input to test and evaluate the system performance. After each target or transparency was placed in direct contact with the light–emitting surface of the plasma tube, the corresponding Walsh transform was obtained. Although the PISA produces 512 by 512 Walsh transform coefficients for each target or transparency, only the first 64 by 64 lower order coefficients were transmitted to the system minicomputer for further processing to yield quantitative measurement and display of their relative magnitude. It was discovered that the significant spectral components are distributed among a few lower order Walsh transform coefficients for all the cases examined. Therefore, the results included in this report are restricted to the first 32 by 32 lower order transform coefficients, although it is possible to print out all 64 by 64 coefficients.

The less significant Walsh transform coefficients can be filtered out if so desired. Either filtered or unfiltered results can be displayed by a monitor set. Figures 11 through 38 are arranged to show the original test target, the corresponding Walsh transform coefficients, the filtered coefficients, and the filtered coefficients that are displayed by a monitor set for these targets stated above. The shaded areas of the targets are transparent and the unshaded one,opaque. In figures 11 through 22, the results are shown for the targets representing a road intersection, a horizontal line road, and a square building, respectively. It is seen that the signal signature of the spectrally decomposed components (or Walsh transform coefficients) is very simple for all cases. The significant spectral components are distributed among the very few lower order Walsh transform coefficients.

Further, each transform is unique in itself and can be distinguished easily from the rest. For example, the road intersection resulted in large first row and first column coefficients (figures 12 & 13), the horizontal straight line road yielded large coefficients in the first column (figures 16 & 17), and the square image was transformed into four large coefficients (two in the first row and two in the third row) (figures 20 & 21). If now the straight line road is turned 90 degrees, then the corresponding significant spectral components (or Walsh transform coefficients) will appear in the first row as shown in figures 24 and 25. In figures 27 to 41, the results are shown for the three types of targets considered above after turning 45 degrees with respect to the x, y coordinates of the plasma tube. Again, very simple, yet unique, distributions of spectral decomposition were observed for all cases. It is evident that a simple decision procedure, either in hardware or software, can be implemented to detect and recognize the above limited set of targets automatically. A figure for the CRT display of figure 39 is not included because of a failure in photographic work.

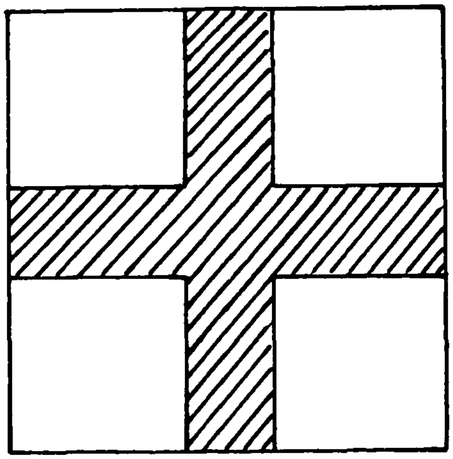

FIGURE 11. Target Representing Road Intersection.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	62	-2	32	4	32	0	38	-6	10	4	12	8	10	4	14	4	0	0	0	0	-6	0	-2	2	10	2	10	6	14	4	12	2
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13	14	0	-2	4	-6	2	-4	-2	-2	-4	2	-4	-2	-4	0	-4	0	0	0	-4	-2	-2	0	0	-2	-2	0	0	0	0	0	0
14	-2	-4	-2	0	-2	-2	-2	-6	-4	-6	-2	-8	-2	-6	-2	-8	-6	-6	-4	-6	-6	-6	-6	-6	-6	-6	-4	-6	-4	-4	-6	-4
15	12	0	-2	2	-4	0	-4	-4	-2	-6	-2	-4	-2	-6	-2	-8	-2	-4	-4	-8	-6	-6	-4	-6	-6	-6	-4	-4	-2	-4	-4	-4
16	2	-4	0	-2	-2	-2	-2	-6	-4	-6	-4	-6	-4	-8	-2	-8	-6	-8	-6	-10	-10	-8	-8	-8	-8	-8	-8	-8	-6	-8	-6	-8
17	6	0	2	4	0	2	0	0	-2	-2	0	-2	0	-2	-2	-6	-2	-2	-2	-6	-4	-4	-4	-6	-4	-6	-4	-4	-4	-2	-4	-6
18	10	-2	-2	2	-4	0	-2	-2	-4	-4	0	-4	-4	-4	-2	-6	-2	-4	-2	-6	-4	-4	-4	-8	-6	-8	-4	-6	-6	-6	-4	-6
19	6	-2	4	4	0	2	0	0	0	-2	2	-2	0	-2	0	-4	-2	-2	0	-4	-4	-2	-2	-4	-2	-4	-2	-4	-2	-2	-2	-4
20	10	-2	-2	2	-4	0	-2	-2	-2	-4	0	-4	-2	-2	-2	-6	-2	-4	-2	-6	-4	-2	-4	-6	-4	-4	-2	-6	-4	-4	-4	-6
21	4	0	2	2	-2	0	0	-2	-2	-2	0	-4	0	-4	0	-6	-2	-2	-2	-4	-6	-4	-4	-6	-4	-4	-2	-4	0	-4	-4	-4
22	6	-2	-2	-2	-4	-2	-4	-4	-4	-6	-2	-6	-4	-4	-2	-6	-4	-4	-4	-8	-8	-6	-6	-6	-6	-6	-6	-8	-4	-6	-4	-6
23	2	-2	2	[illegible]	0	0	0	-2	-2	-4	0	-4	0	-4	0	-6	-2	-2	-2	-6	-4	-4	-4	-6	-4	-4	-4	-4	-2	-2	-2	-4
24	8	-4	-2	[illegible]	-4	-2	-4	-4	-6	-8	-2	-6	-4	-8	-2	-8	-4	-6	-4	-6	-8	-8	-6	-8	-8	-8	-8	-8	-8	-6	-6	-6
25	14	4	4	6	0	6	2	2	2	2	4	0	2	-2	4	-2	2	2	2	-2	-2	-2	0	0	0	-2	0	0	0	0	0	0
26	6	2	2	2	0	2	0	-2	-2	-2	2	-4	-2	-4	0	-6	-2	-4	-2	-6	-6	-6	-2	-4	-4	-6	-2	-4	-2	-4	-4	-4
27	14	8	6	8	2	8	2	4	4	2	8	2	4	2	6	0	4	4	4	0	0	0	2	0	2	0	2	0	2	0	0	0
28	8	4	4	6	0	4	4	0	0	-2	2	-2	2	0	2	-2	0	0	0	-4	-2	-2	-2	-4	-2	-4	-2	-2	-2	-2	-2	-2
29	16	6	6	8	2	8	4	4	2	2	6	2	2	2	4	0	4	4	4	0	0	0	2	-2	0	-2	2	0	4	0	2	0
30	8	0	2	2	0	2	2	-2	0	0	2	-2	2	-2	2	-2	-2	0	0	-2	-2	-2	0	-2	-2	-2	0	-2	0	-4	-2	-4
31	12	4	4	6	2	6	2	4	4	2	6	0	4	2	6	0	4	4	4	2	2	2	4	2	2	0	6	2	4	4	4	2
32	8	0	2	2	0	2	0	-2	-2	-4	2	-2	0	0	2	-4	-2	-2	0	-4	-4	-2	-2	-2	-2	-4	0	-2	-2	-2	0	-4

FIGURE 12. Walsh Transform of Figure 11.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	62	0	38	0	28	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 13. Walsh Transform of Figure 11 after Filtering.

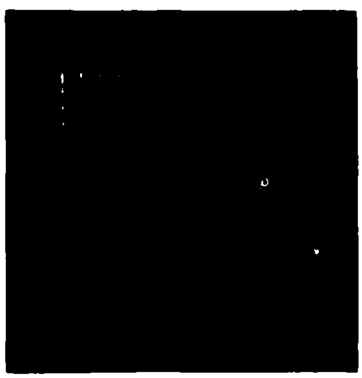

FIGURE 14. CRT Display of Figure 13.

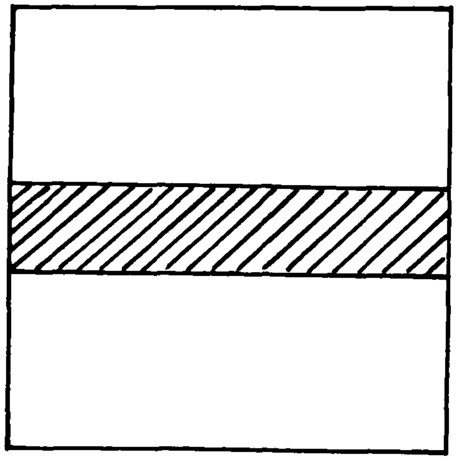

FIGURE 15. Target Representing Horizontal Line Road.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	45	3	11	11	-3	1	1	-3	-1	1	5	1	-1	1	1	-1	3	3	1	-1	-3	-1	-1	1	5	-3	1	3	5	1	3	3
2	9	5	1	3	-1	3	1	-1	1	1	3	1	1	1	1	-1	1	1	1	-3	-3	-1	-1	-1	-1	-4	-1	1	-1	-1	-1	-1
3	63	5	9	7	-1	5	5	-1	1	3	5	1	3	1	5	-1	5	3	3	-1	-1	-1	-1	1	1	-3	1	3	3	1	1	1
4	13	7	5	5	3	3	3	-1	3	1	5	3	1	1	3	1	3	3	3	1	-1	-1	-1	1	-1	-1	1	1	1	1	-1	-1
5	61	3	7	7	1	5	5	-1	3	3	7	3	3	3	5	1	5	5	3	-1	-1	1	1	1	3	-3	3	3	5	1	1	3
6	9	1	5	5	1	5	5	1	3	3	5	3	3	1	3	1	3	5	3	1	-1	1	1	1	3	1	3	1	3	1	1	1
7	55	3	7	7	-1	5	5	-1	1	3	5	3	1	3	5	1	5	5	5	1	-1	1	3	3	5	-1	5	5	5	3	5	5
8	11	3	3	5	1	3	1	-1	1	3	3	3	3	1	3	1	5	3	3	-1	-1	1	3	1	1	1	3	1	3	3	1	1
9	11	3	3	5	1	5	3	1	3	5	5	3	3	3	3	1	3	3	3	1	-1	3	3	3	3	1	3	3	5	5	3	5
10	5	1	-1	5	-1	1	1	-1	-1	-1	1	-1	-1	-1	-1	-3	1	-1	-1	-3	-3	-1	-1	-1	-1	-3	1	-1	-1	-1	-1	1
11	7	3	5	5	3	3	3	-1	3	1	5	3	3	3	3	1	3	3	3	1	-1	1	1	3	3	1	1	3	3	3	3	3
12	7	-1	1	1	-1	1	-1	-3	-1	-1	1	-1	-1	-1	1	-1	-1	-1	-1	-3	-5	-1	-1	-3	-3	-3	-1	-1	-1	-1	-1	-3
13	13	3	3	3	1	3	1	-1	1	3	3	3	1	3	1	1	3	3	3	1	-1	1	1	1	1	-1	3	1	3	1	1	1
14	5	-1	-1	1	-1	1	-1	-3	-1	-1	-1	-1	-3	-3	-1	-3	-1	-1	-1	-3	-5	-5	-3	-3	-3	-5	-1	-1	-1	-1	-3	-3
15	13	3	3	5	1	5	1	-1	1	3	3	1	3	1	3	-1	3	3	3	1	1	-1	1	1	1	-1	3	1	3	3	1	3
16	5	-1	-1	1	-3	1	-1	-3	-1	-1	1	-1	-1	-3	-1	-3	-1	-1	-1	-5	-5	-3	-3	-1	-3	-5	-1	-1	-3	-3	-3	-1
17	5	-1	-3	1	-3	-1	-1	-3	-1	-1	-1	-3	-1	-3	-1	-3	-1	-1	-1	-3	-5	-1	-3	-3	-3	-3	-1	-1	-3	-1	-3	-1
18	5	-1	-1	-1	-3	-1	-1	-5	-1	-1	-1	-3	-1	-1	-1	-3	-1	-1	-1	-3	-5	-3	-5	-1	-1	-5	-1	-1	-1	-3	-3	-1
19	3	-3	-1	-1	-3	-1	-3	-5	-3	-3	-1	-3	-3	-3	-3	-5	-3	-3	-3	-5	-7	-3	-5	-3	-3	-5	-1	-3	-1	-3	-1	-3
20	5	-1	-1	-1	-3	-1	-3	-5	-3	-3	-1	-1	-3	-5	-3	-3	-3	-1	-1	-5	-5	-3	-3	-3	-3	-5	-3	-3	-1	-1	-3	-3
21	1	-3	-1	-1	-5	-1	-3	-5	-5	-3	-3	-3	-5	-5	-3	-5	-3	-3	-3	-7	-7	-5	-5	-5	-3	-7	-5	-5	-5	-3	-5	-3
22	5	-1	-1	-1	-3	-1	-3	-5	-3	-3	-1	-3	-5	-3	-3	-5	-1	-3	-3	-7	-7	-5	-5	-5	-5	-7	-3	-5	-5	-3	-5	-3
23	1	-1	-1	-1	-3	-1	-3	-3	-3	-3	-1	-3	-3	-3	-3	-5	-3	-3	-3	-7	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
24	5	-1	-1	1	-3	-1	-3	-5	-1	-3	-1	-3	-3	-3	-3	-5	-3	-3	-1	-5	-5	-3	-5	-5	-5	-5	-5	-5	-5	-5	-3	-3
25	11	7	5	7	3	5	3	1	3	3	5	3	3	1	5	1	5	5	3	3	-1	1	1	3	1	1	1	3	3	3	3	1
26	5	-5	-1	-1	-5	-3	-3	-5	-3	-3	-1	-3	-3	-3	-3	-5	-3	-3	-3	-5	-7	-5	-5	-5	-5	-7	-3	-5	-5	-5	-5	-5
27	7	5	5	5	5	5	3	3	5	5	5	3	3	1	3	1	1	3	3	1	1	1	3	3	3	1	3	1	3	3	3	1
28	5	-5	-3	1	-5	-1	-3	-5	-5	-5	-1	-3	-5	-3	-3	-5	-3	-3	-3	-5	-7	-5	-5	-5	-5	-7	-5	-5	-5	-5	-5	-5
29	13	5	5	5	3	5	3	1	3	3	5	3	1	3	3	-1	5	3	3	1	-1	1	1	1	3	-1	3	3	1	1	1	1
30	5	-3	-3	-1	-5	-1	-3	-5	-3	-3	-1	-3	-3	-3	-3	-7	-3	-5	-3	-5	-5	-7	-5	-5	-3	-7	-5	-3	-3	-3	-5	-3
31	11	5	5	7	3	5	3	1	3	3	5	3	5	3	3	1	3	5	5	1	-1	1	-1	1	1	1	3	1	1	3	1	3
32	7	-1	-1	1	-3	-1	-3	-5	-3	-3	-1	-3	-3	-5	-3	-5	-3	-3	-3	-5	-7	-5	-7	-5	-5	-7	-5	-5	-3	-3	-5	-5

FIGURE 16. Walsh Transform of Figure 15.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 17. Walsh Transform of Figure 15 after Filtering.

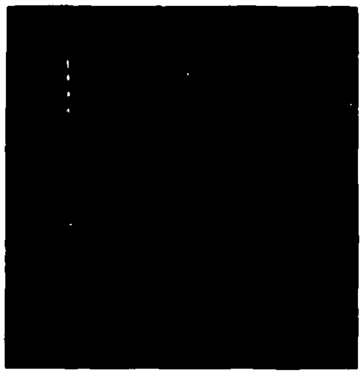

FIGURE 18. CRT Display of Figure 17.

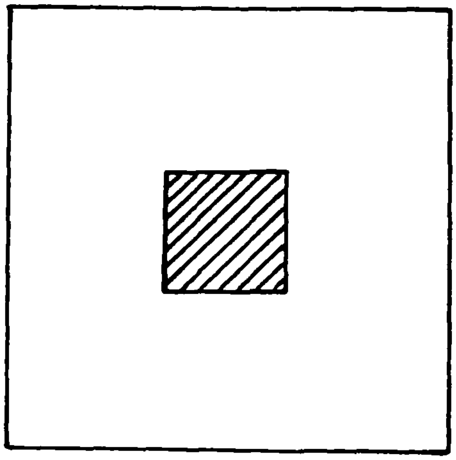

FIGURE 19. Target Representing Square Building.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	31	-1	35	3	9	3	11	1	-7	-1	-7	1	9	1	11	-1	1	1	3	1	-3	-3	-3	-1	-1	-1	1	-1	5	1	7	1
2	5	1	3	1	1	-1	1	-1	-1	-1	-1	-1	1	-1	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	-1
3	35	-1	31	1	9	1	9	-1	-7	-1	-7	-1	9	-1	9	-1	1	1	1	1	-3	-3	-3	-1	-1	-3	-3	-1	5	1	7	1
4	5	1	5	3	1	1	-1	1	1	-1	-1	-1	1	-1	1	-1	1	1	1	-1	-1	-1	-1	-3	-1	-1	-1	-1	1	1	1	1
5	15	1	11	3	3	3	5	1	-1	1	-1	-1	5	-1	7	-1	3	1	1	1	-1	-1	-1	-1	-1	1	1	1	3	3	3	1
6	1	1	1	3	1	1	1	1	1	-1	3	1	1	1	3	-1	1	1	1	1	-1	1	-1	1	1	1	1	1	1	1	1	1
7	15	1	13	1	3	1	3	1	-3	-1	-1	-1	3	1	5	-1	1	1	3	1	-1	-1	-1	-1	-1	-1	1	-1	3	1	3	1
8	1	1	-1	3	-1	3	-1	1	1	-1	3	-1	1	1	3	-1	1	1	1	-1	-1	-1	1	-1	1	1	1	1	1	1	1	1
9	-5	1	-5	3	-1	1	-3	-1	3	-1	3	-1	-1	-1	-1	1	1	1	1	-1	-1	1	-1	-1	1	1	1	1	1	1	1	1
10	3	-1	3	1	-1	-1	1	1	1	-1	1	-1	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	-1
11	-3	1	-5	3	-1	1	-1	1	3	1	3	1	-1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	1	-1	-1	1	1	-1
12	3	1	1	3	-1	1	1	1	1	-1	1	-1	1	-1	1	-1	1	1	1	-1	-1	-1	-1	-3	-1	-1	-1	-1	1	1	-1	-1
13	13	1	9	1	3	1	3	1	-1	-1	-1	-1	3	-1	3	-1	1	1	1	-1	-3	-1	-3	-3	-1	-1	-1	-3	1	-1	1	-1
14	5	1	3	1	-1	-1	-1	-1	-3	-1	-1	-3	-1	-1	1	-1	-1	-1	-1	-1	-3	-3	-3	-3	-1	-3	-1	-3	-1	-1	-1	-1
15	11	1	9	3	1	1	3	1	-3	-1	-3	-1	3	-1	3	-1	1	-1	1	-1	-3	-1	-3	-1	-1	-1	-1	-1	1	1	1	1
16	5	-1	3	1	-1	-1	-1	-1	-1	-3	-1	-3	1	-1	1	-1	-1	-3	-1	-3	-3	-3	-5	-3	-3	-3	-3	-3	-1	-1	-1	-1
17	7	1	3	1	1	1	1	1	-1	-1	-1	-1	1	1	1	-1	-1	1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	1	-1	1	1
18	1	1	-1	3	-1	1	-1	1	1	-1	3	-1	1	-1	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	-1
19	5	1	3	1	1	1	1	1	1	-1	1	-1	1	-1	1	-1	1	1	-1	-1	-1	-1	-1	-3	-1	-1	-1	-1	-1	1	1	1
20	3	1	1	1	1	1	1	1	1	-1	1	-1	1	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	-1
21	5	1	1	1	-1	1	-1	-1	-1	-1	-1	-1	1	-1	1	-1	1	-1	-1	-1	-3	-3	-3	-3	-1	-3	-1	-3	-1	-1	-1	-1
22	5	1	3	1	-1	1	1	1	-1	-3	-1	-3	1	-1	1	-3	-1	-1	1	-1	-3	-3	-3	-3	-3	-3	-3	-3	-1	-1	-1	-1
23	3	1	3	3	1	1	1	1	1	-1	1	-1	1	-1	3	-1	-1	-1	-1	-1	-3	-1	-3	-1	-1	-1	-1	-1	-1	-1	-1	-3
24	5	-1	3	1	-1	1	1	1	-1	-1	-1	-1	1	-1	1	-1	1	-1	1	-1	-3	-1	-3	-3	-1	-1	-1	-3	-1	-1	1	-1
25	3	3	-1	5	1	3	3	3	3	1	3	1	3	3	3	1	3	1	3	1	1	1	1	1	1	1	1	1	3	3	3	3
26	7	-1	1	1	-1	-1	-1	-1	-1	-1	-1	-3	1	-1	1	-1	-1	-1	1	-1	-3	-1	-3	-1	-1	-1	-1	-1	-1	-1	1	-1
27	1	3	1	3	1	3	1	1	3	1	3	1	1	1	3	1	1	1	3	1	-1	1	1	-1	1	1	1	1	3	1	3	1
28	5	-1	3	1	-3	-1	-1	-1	-3	-3	-1	-3	1	-1	1	-3	-1	-1	-1	-3	-3	-3	-3	-3	-1	-1	-1	-1	-1	-1	-1	-1
29	5	5	7	3	1	3	3	1	1	1	3	1	3	1	8	1	3	1	3	1	-1	-1	1	1	1	1	1	1	3	3	1	3
30	3	1	1	1	-1	-1	1	1	1	-1	-1	-1	-1	-1	1	-1	-1	-1	-1	-1	-3	-1	-1	-1	-1	-1	-1	-1	1	-1	1	-1
31	7	3	5	3	3	1	3	3	1	1	1	1	3	1	3	1	3	1	3	1	1	1	1	-1	1	1	1	1	3	3	1	3
32	3	1	1	1	-1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	-3	-1	-3	-1	-1	-1	-1	-1	-1	-1	-1	-1

FIGURE 20. Walsh Transform of Figure 19.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	31	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	37	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 21. Walsh Transform of Figure 19 after Filtering.

FIGURE 22. CRT Display of Figure 21.

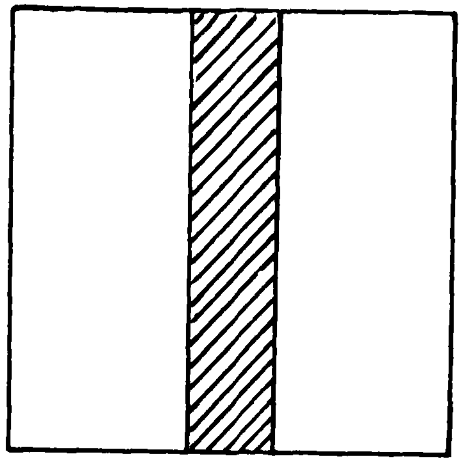

FIGURE 23. Target Representing Vertical Line Road.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	49	-3	57	3	43	3	45	1	1	-9	1	-5	3	-5	5	-5	-5	-1	-5	-1	-7	-1	-7	-1	5	-5	7	-3	9	-3	9	-3
2	5	-3	5	1	1	-1	1	1	1	-3	1	-3	1	-3	-1	-3	-1	-3	-5	-3	-5	-3	-3	-5	-1	-3	-1	-3	1	-1	-3	-3
3	7	1	7	3	3	3	5	3	3	-1	3	-1	3	-1	3	-3	1	1	1	-1	-1	-1	-1	-1	1	1	1	-1	1	1	3	-1
4	3	3	3	5	1	5	1	3	5	1	7	1	5	1	5	1	3	3	3	1	1	3	1	1	3	5	5	1	5	3	5	1
5	3	1	1	3	-1	1	-1	1	1	-3	1	-1	1	-1	1	-1	1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	1	1	1	3	1
6	3	-3	1	1	-1	-1	-1	-1	-1	-5	1	-5	-1	-5	1	-5	-1	-3	-3	-3	-3	-3	-3	-3	-1	-3	-1	-3	-1	-1	1	-3
7	3	1	1	1	1	3	1	1	1	-3	1	-3	1	-3	1	-3	-1	-1	-1	-3	-1	-3	-1	-1	-1	-1	1	-3	1	-1	1	-1
8	3	1	1	1	-1	1	1	1	1	-3	3	-3	1	-3	1	-3	-1	-3	-1	-3	-1	-3	-3	-3	-1	-1	-1	-1	-1	-1	-1	-1
9	5	1	1	3	-1	3	1	1	1	-3	1	-1	1	-1	1	-3	-1	-3	-1	-5	-3	-3	-1	-3	-1	-3	-1	-3	-1	-1	-1	-3
10	5	3	5	5	1	5	1	3	3	1	3	-1	3	1	3	-1	1	-1	1	-1	-1	-1	1	-1	1	-1	-1	-1	1	1	1	-1
11	7	3	5	5	3	5	3	3	1	1	3	-1	3	-1	5	-1	1	-1	1	-1	-1	-1	1	-1	1	1	1	-1	1	-1	1	-1
12	7	3	3	5	1	5	3	3	1	-1	1	-1	3	-1	3	-3	1	-1	1	-3	-1	-3	1	-1	1	-1	1	-1	1	-1	1	-1
13	5	3	3	5	3	5	3	5	3	1	5	-1	3	1	3	-1	3	1	3	-1	-1	-1	1	-1	1	-1	3	-1	1	1	1	1
14	9	1	3	3	1	3	1	1	1	-3	1	-3	1	-1	1	-3	-1	-1	-1	-3	-3	-3	-1	-3	1	-1	1	-1	1	-1	1	-1
15	5	-1	3	1	1	1	1	1	-1	-3	1	-3	-1	-3	1	-5	-3	-3	-3	-3	-3	-3	-3	-3	-1	-3	-1	-3	-1	-3	-1	-3
16	5	-3	1	-1	1	-1	1	-1	-3	-5	-1	-7	-3	-5	-1	-5	-5	-5	-3	-5	-5	-5	-5	-5	-5	-5	-3	-5	-3	-5	-3	-5
17	5	3	3	5	1	3	3	3	3	-1	3	-1	3	-1	3	-3	1	1	-1	-1	-1	-1	1	-1	1	1	1	1	1	1	1	1
18	7	3	3	5	3	3	3	3	3	-1	5	-1	3	-1	5	-1	1	-1	1	-1	-1	1	1	1	1	1	1	1	1	1	1	1
19	9	3	5	5	3	5	3	1	3	-1	5	-1	3	1	3	-1	1	-1	1	-3	-1	-1	-1	-1	-1	1	1	1	1	1	1	1
20	9	5	5	7	5	7	5	5	5	1	7	1	7	1	5	1	3	1	3	1	1	1	1	-1	1	3	1	1	1	1	3	1
21	7	3	5	5	3	5	3	3	3	-1	5	-1	3	-1	3	-1	1	1	1	-3	-3	1	-1	-3	-1	1	-1	-1	-1	-1	1	-1
22	7	3	5	5	5	5	3	3	3	-1	5	-1	3	-1	5	-3	1	1	1	-1	-1	1	1	-1	1	1	1	-1	1	1	1	-1
23	7	3	5	5	3	5	5	3	3	-1	3	-1	5	-1	3	-3	1	-1	3	-1	1	1	1	-3	1	1	1	-1	1	1	1	1
24	7	1	1	1	1	3	1	1	1	-3	1	-3	1	-3	1	-3	1	-3	1	-3	-3	-3	-1	-3	-1	1	1	-1	-1	-1	1	-3
25	5	3	3	5	1	5	1	5	3	-1	3	-1	5	1	5	-1	3	1	1	-1	1	1	3	1	3	3	1	1	3	3	3	1
26	7	-1	3	3	1	3	1	1	-1	-3	1	-3	3	-1	1	-3	1	-1	-1	-3	-1	-3	-1	-3	1	-1	1	-1	1	-1	1	-1
27	5	3	3	5	1	5	3	5	3	1	3	1	3	-1	3	-1	1	1	3	-1	1	-1	1	-1	3	1	3	1	3	1	3	1
28	7	1	3	3	1	3	3	3	1	-1	3	-1	1	-1	3	-3	1	-1	-1	-3	1	-1	-1	-3	1	-1	1	-3	1	-1	1	-1
29	5	1	1	3	1	3	1	3	1	-3	3	-3	1	-1	1	-3	1	-1	1	-1	-1	-1	-1	-3	1	-1	1	-3	1	-1	1	-1
30	5	-1	3	1	1	1	1	1	-1	-5	-1	-5	1	-3	-1	-5	-3	-3	-1	-5	-3	-3	-3	-5	-1	-3	-1	-5	-1	-3	-1	-3
31	5	3	3	5	1	3	3	3	3	-1	3	-1	3	-1	3	-1	1	-1	1	-1	-1	-1	1	-1	1	1	1	-1	1	1	1	1
32	5	1	3	3	1	1	1	1	1	-3	1	-3	1	-3	1	-3	-1	-3	-1	-3	-1	-3	-1	-3	-1	-1	-1	-3	1	-1	1	-3

FIGURE 24. Walsh Transform of Figure 23.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	50	0	54	0	40	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 25. Walsh Transform of Figure 23 after Filtering.

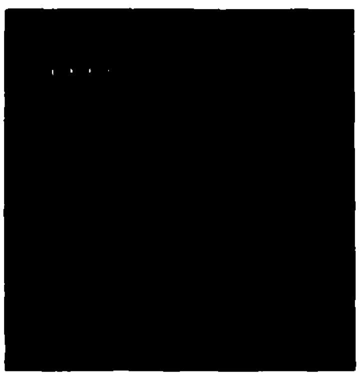

FIGURE 26. CRT Display of Figure 25.

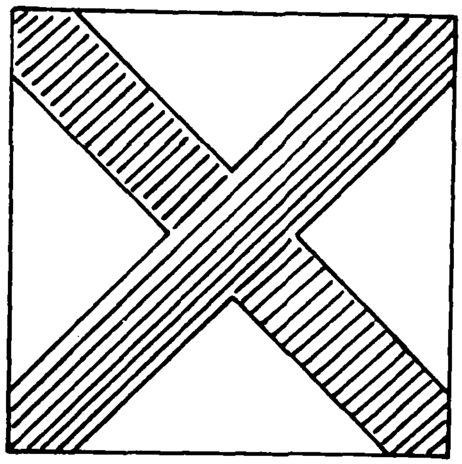

FIGURE 27. Target Representing Diagonally Oriented Road Intersection

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	84	6	2	2	-24	0	0	-10	-8	-4	2	-4	-10	0	2	-6	0	0	0	-6	-12	-4	-4	-2	-4	-10	0	-2	0	0	0	2
2	16	4	0	8	0	-2	0	-2	0	0	4	0	0	-2	0	-4	2	-2	-2	-6	-8	-4	-6	-4	-4	-8	-4	-4	-4	-2	-4	-4
3	22	0	76	12	4	16	20	2	8	2	-10	2	6	4	12	0	2	2	2	-2	-4	-2	-2	0	-2	-2	-4	-4	0	6	10	0
4	20	8	14	20	8	20	10	8	12	10	12	10	10	10	12	6	12	10	12	6	2	6	6	6	6	2	8	4	8	10	6	6
5	-2	6	6	0	34	8	4	6	0	6	10	6	22	6	8	2	8	4	4	2	0	2	2	2	2	0	4	4	10	4	0	2
6	20	6	6	2	2	6	2	2	6	4	6	6	4	4	6	0	4	4	6	0	-2	2	0	2	2	2	4	2	2	6	2	2
7	14	0	22	10	2	6	6	0	4	0	10	4	8	0	10	2	6	6	6	2	0	4	4	4	2	0	4	2	4	8	8	2
8	18	4	6	12	0	6	6	-4	4	2	6	4	2	4	6	2	6	6	6	0	-2	2	2	2	0	0	4	4	6	6	6	6
9	12	4	4	8	-6	4	4	0	-2	4	4	2	4	2	4	0	4	4	2	0	-2	0	0	0	-2	0	2	2	2	6	4	2
10	18	6	8	12	4	10	8	4	8	6	10	4	6	6	6	2	6	8	6	2	0	4	6	4	4	2	6	2	6	8	4	6
11	14	6	-10	10	2	6	6	0	2	6	4	4	2	0	2	0	4	6	6	0	-2	-2	0	0	0	-2	4	4	2	2	2	2
12	14	8	6	6	2	4	0	0	0	4	6	2	4	-2	4	0	4	0	2	0	-4	-2	0	0	-2	0	2	0	2	2	0	2
13	6	4	6	6	16	6	4	2	8	4	6	8	6	2	6	-2	6	2	2	0	-6	2	2	2	0	0	2	4	2	2	0	2
14	16	2	4	4	-4	4	2	-4	0	-2	0	0	0	-2	2	-4	0	0	0	-4	-6	-4	-4	-2	-4	-6	-2	-4	-4	0	-2	-2
15	12	0	6	4	-2	2	4	-6	-2	-2	0	-2	-2	-2	4	-4	0	0	0	-6	-8	-6	-6	-4	-6	-6	-2	-4	-2	-2	-2	-8
16	10	-4	-2	-2	-10	-6	-6	-8	-6	-6	-2	-6	-6	-4	-8	-8	-4	-2	-6	-10	-12	-10	-8	-8	-8	-10	-6	-8	-8	-6	-8	-8
17	10	0	4	6	0	4	2	-4	2	2	4	4	2	2	2	-4	4	4	2	0	-4	0	0	0	0	-2	2	0	0	2	0	2
18	10	2	0	6	-2	0	-2	-4	0	0	0	2	2	-2	2	-4	2	0	2	-2	-4	-2	-2	-2	-2	-4	0	-2	2	2	2	2
19	10	0	0	2	-4	0	-4	-6	-4	-4	2	0	-2	-4	-2	-4	0	-4	-2	-6	-8	-4	-4	-4	-4	-6	-2	-2	-2	2	-2	0
20	10	2	2	6	0	4	4	-4	2	0	2	2	0	-2	4	-4	2	-2	0	-2	-6	0	-2	-2	-2	-2	0	0	0	2	0	0
21	12	-2	2	4	-8	-2	-4	-8	-2	-6	-2	-2	-10	-6	-2	-8	-4	-6	-4	-10	-12	-8	-10	-8	-8	-10	-8	-6	-8	-4	-6	-6
22	10	0	0	4	-6	0	0	-8	-2	-4	-2	-2	-4	-6	-2	-6	-4	-4	-4	-8	-10	-8	-10	-8	-8	-10	-8	-6	-8	-6	-6	-8
23	10	0	2	4	-4	0	0	-6	-2	0	-2	-2	-4	-4	-4	-6	-4	-4	-4	-8	-10	-6	-10	-8	-10	-8	-6	-8	-6	-6	-8	-8
24	12	0	-2	2	-8	0	-4	-6	-4	-4	-2	-4	-6	-4	-2	-6	-4	-4	-4	-6	-12	-8	-4	-8	-8	-10	-6	-8	-8	-6	-8	-8
25	12	4	4	8	0	6	4	0	-2	2	4	2	2	0	4	-2	2	2	2	-2	-4	0	0	-2	-2	-4	0	0	0	4	0	-2
26	12	0	2	4	-4	0	0	-4	-2	-2	2	0	-2	-2	0	-4	-2	-2	-2	-6	-8	-6	-6	-4	-2	-6	-4	-4	-6	0	-4	-4
27	10	6	-2	8	2	6	4	-2	4	6	6	4	2	0	2	-2	6	6	4	-2	-4	0	0	2	0	-2	0	2	-2	2	0	0
28	12	2	6	4	0	2	2	-4	0	0	2	0	0	-2	0	-2	0	0	0	-4	-6	-4	-6	-4	-6	-6	-2	-2	-2	0	0	-4
29	8	2	0	2	4	2	0	-4	0	-2	2	0	0	-2	0	-6	-2	0	-2	-6	-10	-4	-4	-4	-4	-4	-2	-2	-2	-2	-4	-4
30	14	0	4	4	-2	2	0	-4	-2	-4	0	0	-2	-2	-4	-4	-2	-2	-2	-6	-6	-4	-6	-6	-4	-6	-4	-4	-4	-2	-4	-4
31	12	6	10	10	0	6	4	0	0	0	4	2	0	0	4	0	2	0	2	-2	-4	-2	-2	-4	-2	-6	0	-2	-2	2	0	-2
32	16	4	6	6	-2	4	0	-2	0	0	2	0	0	0	0	-6	0	0	-2	-6	-8	-6	-4	-6	-8	-8	-2	-6	-4	-2	-6	-4

FIGURE 28. Walsh Transform of Figure 27.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 29. Walsh Transform of Figure 27 after Filtering.

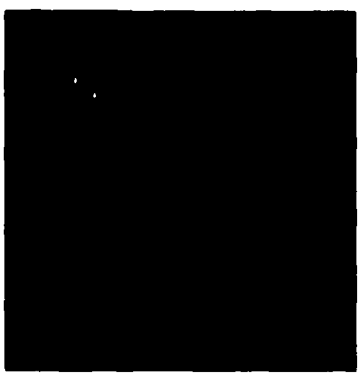

FIGURE 30. CRT Display of Figure 29.

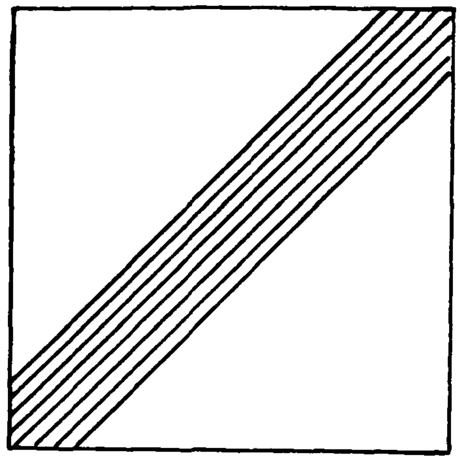

FIGURE 31. Target Representing Diagonally Oriented Line Road (1).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	60	2	8	0	-12	0	6	-8	0	-2	2	-2	-4	-2	4	-6	0	-2	0	-6	-6	-4	-4	0	0	-6	0	0	0	0	0	0
2	4	-56	-6	0	-4	16	0	-4	-2	-4	0	-6	-2	0	0	-8	-4	-6	-2	-10	-6	-6	-6	-6	-4	-8	-6	-6	-4	-4	-6	-6
3	26	2	40	4	4	0	14	0	0	-2	-4	0	2	-2	8	0	2	0	0	-2	-4	0	-2	-4	-2	-2	-2	-4	2	2	6	0
4	12	8	4	-16	4	12	2	0	6	6	4	10	4	4	2	0	4	4	2	2	-2	0	0	0	0	2	2	4	0	4	0	0
5	4	8	12	4	22	4	6	2	2	0	4	4	12	0	6	0	2	2	2	-2	-4	0	0	-2	-2	-2	0	0	2	0	0	0
6	12	26	10	10	2	-6	2	6	4	4	2	6	4	-4	8	0	2	2	0	0	-2	0	-2	-2	-2	-2	0	0	0	0	-2	2
7	18	4	22	8	6	6	6	2	4	6	4	2	4	2	6	0	2	0	4	0	-2	2	2	0	0	0	0	-2	2	2	2	0
8	12	12	2	2	0	10	4	8	0	2	8	4	4	4	6	0	6	2	2	0	0	0	2	-2	0	-2	4	2	2	4	0	0
9	12	8	4	6	2	2	2	4	-6	4	4	4	4	2	4	0	4	4	4	2	0	4	0	0	-4	2	0	4	2	6	2	4
10	10	6	8	6	6	4	0	4	2	8	6	0	2	2	6	0	2	4	4	2	-2	2	4	2	2	4	4	2	4	4	4	4
11	8	6	0	8	2	6	2	0	0	2	4	2	2	2	2	[illegible]	4	2	2	0	2	0	0	2	0	0	2	0	2	4	2	4
12	10	10	4	12	-2	2	6	0	4	2	4	2	4	0	2	0	4	0	4	0	0	0	0	0	0	0	2	0	2	4	0	4
13	6	4	8	2	8	4	2	0	4	2	2	0	4	2	4	0	0	0	2	0	-2	0	0	0	0	0	0	6	[illegible]	2	2	0
14	8	8	4	2	0	-4	0	-2	-2	-4	2	-2	0	-2	0	-4	0	2	-4	-2	-4	-4	-2	-2	-4	-4	-2	-4	0	0	-2	-2
15	10	-2	8	2	-2	2	2	-4	-4	-2	-4	0	0	-2	2	-4	-2	-2	0	-6	-4	-6	-2	-4	-4	[illegible]	-4	-4	0	0	-2	-2
16	8	0	-4	0	-6	0	-2	-6	-2	-4	-4	-4	-4	-8	-2	-10	-4	-4	-2	-8	-8	-6	-6	-6	-6	-6	-6	-6	-6	-4	-6	-6
17	10	4	4	4	0	2	2	-2	2	0	4	0	2	0	4	0	4	0	2	0	-2	0	0	-2	0	0	0	-2	0	2	0	0
18	8	2	4	4	0	2	0	-2	2	2	2	2	0	2	-2	-2	2	-2	0	0	-2	-2	-2	-2	-2	-2	0	0	-2	0	0	0
19	6	2	0	2	0	0	-4	-2	0	2	0	0	2	0	2	-2	0	2	2	-2	-4	0	0	-2	0	-2	0	0	-2	2	0	-2
20	6	4	0	4	0	0	0	-2	0	0	2	0	0	0	2	0	0	0	2	0	-2	0	0	0	0	-2	0	0	0	2	0	2
21	6	-2	-2	-4	-8	-4	-2	-6	-4	-4	-4	-4	-4	-4	-2	-6	-4	-4	-4	-6	-8	-4	-2	-4	-6	-6	-4	-4	-4	-2	-2	-4
22	6	-4	-4	-2	-6	-4	-4	-8	-6	-6	-4	-4	-6	-6	-4	-8	-4	-4	-6	-6	-8	-6	-6	-8	-6	-6	-4	-8	-4	-4	-4	-6
23	4	-4	-2	-2	-6	-2	-4	-6	-6	-6	-4	-4	-4	-4	-2	-8	-4	-6	-4	-10	-8	-8	-8	-6	-6	-6	-6	-4	-6	-4	-6	-6
24	6	-2	-4	-2	-6	-6	-4	-10	-4	-6	-6	-6	-6	-6	-4	-8	-6	-6	-4	-8	-10	-8	-8	-6	-8	-8	-8	-8	-8	-6	-8	-6
25	8	2	2	2	0	0	-2	0	-4	0	2	0	2	-2	0	-2	-2	0	0	-4	-4	-4	-4	-2	-4	-2	-2	-2	-2	-2	-4	-2
26	8	2	2	2	-2	-2	-2	-4	-4	0	-2	-4	-2	-4	-2	-4	-2	-2	-2	-6	-6	-6	-2	-6	-6	-6	-4	-4	-4	-4	-4	-2
27	6	4	0	4	2	4	2	-2	0	0	2	0	4	0	2	-2	2	0	0	-2	-4	0	-2	0	-2	0	0	0	-2	0	0	-2
28	8	6	2	6	-2	0	2	-2	0	-2	0	0	0	-2	0	-2	0	-2	-2	-4	-4	-2	-4	-2	-4	-4	-2	-4	-2	0	-4	-2
29	6	2	4	2	2	2	0	-2	0	0	0	0	0	-2	0	-2	-2	0	0	-2	-4	-4	-4	-2	-2	-4	0	-2	0	-2	-2	-2
30	8	6	2	2	-2	-2	-2	-4	-2	-2	0	-2	0	-4	-2	-4	0	-2	-2	-4	-6	-4	-4	-4	-4	-6	-2	-4	-4	0	-4	-2
31	8	2	6	4	0	4	2	0	0	0	2	0	2	0	2	-2	2	0	2	-2	-4	-4	-2	-2	-2	-2	0	-2	0	2	0	0
32	10	4	2	0	-2	0	0	-6	-2	-2	0	-2	-2	-4	-2	-4	-2	-2	-4	-4	-6	-4	-4	-6	-4	-4	-2	-2	-4	0	-2	-4

FIGURE 32. Walsh Transform of Figure 31.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	-54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 33. Walsh Transform of Figure 31 after Filtering.

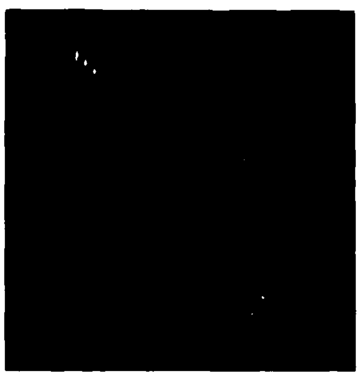

FIGURE 34. CRT Display of Figure 33.

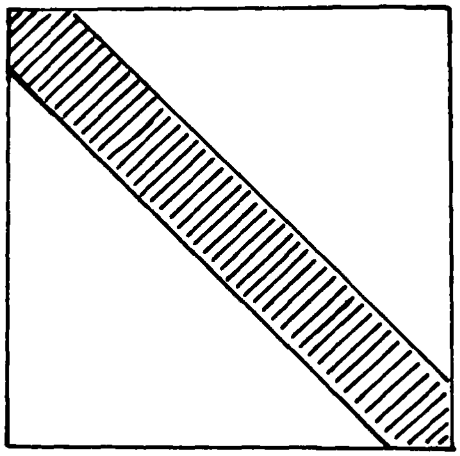

FIGURE 35. Target Representing Diagonally Oriented Line Road (2)

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	60	0	22	12	-12	0	8	-6	2	-2	2	0	-2	-2	4	-4	2	0	2	-4	-6	-2	-2	0	0	-6	0	0	0	2	2	0
2	16	56	12	6	2	-16	0	-6	2	0	2	0	2	-8	2	0	2	4	0	0	-6	4	-2	0	-6	-2	0	0	0	2	0	0
3	24	-8	38	4	6	6	16	-2	0	0	0	0	4	2	8	-2	0	0	0	-4	-4	-2	0	-2	0	0	0	0	0	0	6	0
4	8	4	10	34	8	2	8	6	6	0	6	-4	6	2	4	2	4	2	4	0	0	0	2	0	4	-2	2	0	6	2	6	4
5	2	0	8	2	20	4	6	0	4	4	4	2	10	2	4	-2	2	0	2	0	-4	-2	0	0	0	0	0	0	2	0	0	0
6	12	-16	0	2	2	18	2	-6	2	0	2	0	2	4	2	-2	0	2	2	-2	-2	-2	-2	0	0	-4	-2	-2	-2	2	-2	-2
7	28	2	22	8	4	4	8	2	6	-2	6	6	6	2	6	0	4	4	2	0	0	0	-2	0	0	-2	0	0	0	2	2	0
8	12	-4	6	14	2	2	6	-2	-2	4	6	4	4	4	4	2	6	6	4	0	0	4	2	2	-2	0	2	0	2	0	2	2
9	14	0	4	8	0	10	2	4	-6	2	4	2	6	2	4	2	6	2	6	0	2	0	2	2	0	0	4	0	6	4	4	2
10	8	2	6	8	4	6	4	2	4	-2	6	8	4	6	6	2	6	4	6	2	0	4	2	4	2	0	4	6	4	6	4	6
11	8	2	0	6	2	4	2	4	2	4	2	2	2	4	0	0	2	2	4	0	-2	2	0	0	2	2	2	4	2	4	4	4
12	12	-2	2	0	-2	4	4	0	4	4	2	4	4	2	2	-2	2	2	2	0	0	0	-2	0	4	2	0	0	2	4	2	0
13	6	2	6	6	8	6	4	2	2	2	2	2	6	2	4	0	2	4	6	-4	0	0	0	0	0	-2	2	4	6	4	2	2
14	8	-8	0	4	-2	6	-2	-2	-2	-2	2	-2	0	0	2	-4	2	-4	-2	-6	-4	-4	-2	-4	-4	-4	0	-4	-4	0	-2	-4
15	10	2	8	2	0	0	2	-2	0	-2	-2	-2	0	-6	2	-6	0	-2	0	-2	-6	-4	-4	-4	-2	-4	-4	-2	-2	-2	0	-2
16	8	-6	0	2	-6	-2	-2	-6	-4	-2	-4	-6	-4	-4	-2	-6	-2	-4	0	-6	-8	-6	-6	-6	-4	-6	-4	-6	-4	-6	-4	-4
17	10	0	4	6	2	4	2	0	2	0	2	2	0	4	2	-6	2	2	2	-2	-2	0	0	-2	0	-2	0	0	2	2	0	0
18	8	2	4	6	-2	4	2	0	0	0	6	0	4	-2	0	0	2	2	0	-4	-2	-2	-2	0	-2	-2	2	0	0	0	0	0
19	6	0	0	2	0	4	0	-2	2	0	2	-2	2	-4	2	-2	2	0	2	-2	-4	0	0	-2	-2	-4	0	-2	-2	0	0	0
20	6	0	0	4	0	2	0	0	0	2	4	2	2	2	4	0	2	2	2	0	-4	0	-2	0	0	0	0	0	2	2	0	2
21	6	-4	-2	2	-6	0	-2	-6	-2	-6	-2	0	-4	-4	-4	-6	-4	0	-2	-4	-6	-4	-4	-4	-4	-4	-2	-4	-4	-4	-2	-2
22	4	0	0	2	-6	-4	-6	-2	-6	-2	0	-4	-4	-6	-4	-8	-2	-4	-2	-8	-8	-6	-4	-6	-4	-6	-4	-4	-4	-2	-4	-2
23	2	-2	-2	2	-4	-2	-4	-6	-4	-4	-4	-4	-4	-8	-4	-8	-4	-4	-2	-6	-6	-6	-6	-6	-4	-6	-6	-6	-4	-4	-6	-4
24	6	0	-2	2	-6	-2	-6	-6	-2	-6	-4	-8	-6	-6	-4	-8	-6	-6	-4	-8	-8	-8	-8	-8	-8	-8	-6	-6	-6	-6	-4	-6
25	10	0	2	6	2	2	2	0	-4	0	2	0	0	-2	0	-2	0	0	-2	-4	-4	-4	-2	-6	-4	-4	-2	-2	0	0	-2	-2
26	6	-2	0	0	-4	0	-2	-4	-2	-6	-4	0	-4	-2	-2	-6	-2	-4	-2	-6	-6	-6	-6	-6	-4	-10	-4	-6	-6	-4	-6	-4
27	6	4	0	6	2	2	0	0	2	2	2	0	2	0	0	-4	2	0	2	-2	-4	0	-2	-2	-2	-2	-2	-2	-2	0	-4	0
28	8	-2	2	2	-4	0	-2	-4	-2	0	0	-2	0	-4	-4	-4	0	-2	-2	-4	-4	-4	-4	-4	-4	-4	-2	-4	-2	-2	-2	-4
29	6	0	2	2	2	2	2	-2	0	0	0	0	2	0	0	-2	0	0	0	-4	-4	-4	-2	-2	-2	-4	-2	-4	-2	-2	-2	-4
30	8	-4	0	2	-2	2	0	-4	-4	-2	0	-2	-2	0	0	-4	-2	-2	0	-6	-4	-4	-4	-4	-4	-6	-4	-4	-4	-2	-4	-2
31	6	4	6	6	0	4	4	0	0	0	4	0	2	0	2	-2	2	0	2	-2	-2	0	0	0	-2	-4	0	0	-2	0	0	0
32	8	-2	2	6	-2	0	0	-2	-2	-4	0	-4	-2	-2	0	-4	-2	0	0	-6	-6	-2	-4	-4	-4	-6	-4	-4	-4	0	-4	-2

FIGURE 36. Walsh Transform of Figure 35.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 37. Walsh Transform of Figure 35 after Filtering.

FIGURE 38. CRT Display of Figure 37.

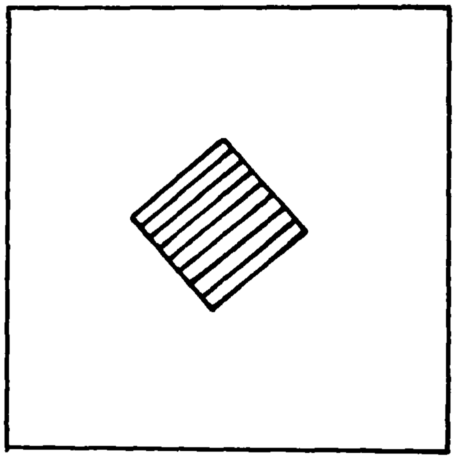

FIGURE 39. Target Representing Diagonally Oriented Square Building

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	29	1	39	5	15	3	15	1	1	1	1	1	9	1	9	1	3	3	1	1	-1	1	-1	1	1	1	3	1	9	1	9	1
2	5	1	3	1	1	-1	1	-1	1	-1	1	1	1	-1	1	-1	1	1	-1	1	-1	-1	-1	-1	1	-1	1	-3	1	1	1	-1
3	37	-1	31	1	11	1	13	-1	-1	-1	1	-1	7	-1	9	-1	1	1	1	-1	-1	-1	-1	1	1	-1	1	-1	9	1	9	3
4	3	1	3	3	1	-1	1	-1	1	1	-1	-1	1	-1	1	-1	1	1	1	1	-1	1	-1	1	1	-1	1	-1	3	1	3	1
5	17	3	15	3	-1	1	1	3	-5	-1	-3	1	3	1	3	1	1	1	1	1	-1	1	1	1	-1	-1	-1	-1	5	1	5	1
6	5	1	3	3	1	1	1	1	1	1	1	-1	1	1	1	-1	1	1	1	-1	-1	-1	1	-1	1	1	1	-1	1	-1	1	1
7	17	1	15	3	-1	1	1	3	-5	-1	-5	-1	3	-1	3	-1	3	1	1	1	-1	1	-1	-1	-1	1	-1	-1	3	3	3	1
8	5	3	3	3	1	1	1	1	1	-1	1	-1	3	1	1	-1	1	1	1	1	-1	1	1	-1	1	-1	1	-1	1	1	1	-1
9	5	1	3	3	-5	1	-3	1	1	1	3	-1	1	1	1	1	1	1	3	1	1	1	3	1	1	-1	1	1	1	1	1	1
10	5	1	3	3	1	1	-1	1	1	-1	1	1	1	-1	1	-1	1	-1	1	-1	-1	1	-1	-1	-1	-1	-1	-1	1	1	1	1
11	3	1	3	3	-5	1	-5	1	1	-1	3	-1	3	1	3	1	1	1	1	1	1	1	1	-1	1	1	1	-1	1	1	1	1
12	5	1	3	1	1	1	-1	1	1	-1	1	-1	1	-1	1	-1	-1	1	1	-1	-3	1	-1	-1	1	-1	1	-3	1	1	1	1
13	9	1	7	1	-1	1	-1	1	-1	-1	1	-1	-1	-1	1	-1	-1	-1	-3	-1	-1	-1	-1	1	-1	-1	-1	-3	1	1	1	1
14	1	-1	1	-1	-3	-3	-1	-3	-1	-3	-1	-3	-1	-3	-1	-3	-1	-3	-1	-3	-3	-3	-3	-3	-3	-3	-1	-3	-1	-1	-1	-1
15	9	-1	7	1	1	-1	-1	-1	-1	-3	-1	-1	-1	-1	-3	-1	-3	-1	-3	-1	-1	-1	-1	-1	-1	-1	1	-3	1	1	1	1
16	3	-1	1	1	-3	-1	-1	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-5	-3	-3	-3	-5	-3	-3	-3	-3	-1	-3	-1	-3
17	3	-1	1	1	-1	-1	-1	-1	-1	-1	-1	-3	-3	-3	-3	-3	-1	-3	-1	-3	-3	-3	-3	-1	-1	-1	-3	-3	-1	-1	-1	-1
18	3	1	1	1	-1	-1	-1	-1	-1	-3	-1	-3	-1	-1	-1	-3	-1	-1	-1	-1	-3	-3	-3	-3	-1	-3	-1	-3	-1	-3	-1	-3
19	3	-1	3	1	-1	1	1	-1	-1	-1	-1	-1	-3	-1	-1	-1	1	-1	-1	-3	-3	-1	-3	-3	-1	-3	-1	-3	-1	-1	-1	-3
20	3	-1	1	1	-3	1	-1	-1	-1	-1	-1	-1	-1	-3	1	-3	-1	-1	-1	-1	-3	-3	-3	-3	-3	-3	-1	-3	-1	-1	-1	-1
21	3	-1	1	-1	-1	-1	-1	-3	1	-3	1	-1	-1	-1	-1	-3	-1	-3	-3	-3	-5	-3	-3	-3	-3	-5	-1	-5	-1	-3	-1	-3
22	3	-3	1	-1	-3	-1	-1	-1	-3	-3	-3	-3	-3	-3	-1	-3	-3	-3	-3	-3	-3	-5	-5	-5	-3	-3	-1	-3	-1	-3	-1	-3
23	3	-1	1	1	-1	-1	-1	-1	1	-3	1	-1	-1	-3	1	-3	-1	-3	-1	-3	-3	-3	-3	-3	-1	-3	-1	-3	-1	-1	-1	-3
24	3	-1	1	-1	-1	-1	-1	-3	-1	-3	-3	-3	-3	-3	-1	-3	-3	-1	-3	-3	-5	-3	-5	-3	-3	-3	-1	-3	-1	-3	-1	-3
25	5	1	3	3	-1	1	-1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	-1	-1	1	-1	1	1	1	3	3	1
26	3	-1	1	1	-1	-1	-1	-1	-3	-3	-1	-3	-1	-3	-1	-3	-3	-3	-1	-3	-3	-3	-3	-3	-1	-3	-3	-3	-1	-3	-1	-3
27	3	3	3	5	-1	3	-1	1	1	1	1	-1	1	1	1	1	1	1	1	1	-1	1	-1	1	1	1	1	-1	1	1	1	1
28	5	-1	3	1	-1	-1	1	-1	-1	-1	-1	-3	-1	-3	-1	-3	-1	-1	-1	-3	-3	-3	-1	-3	-1	-3	-1	-3	-1	-3	-1	-3
29	9	5	7	5	1	3	3	1	1	1	1	1	3	1	3	1	1	1	3	1	1	-1	1	1	1	1	1	-1	1	1	1	1
30	5	1	3	1	1	1	1	1	1	-3	-1	-1	1	-1	1	-1	-1	-1	1	-1	-3	-1	-3	-1	-3	-1	-1	-1	-1	-3	-1	-1
31	9	3	9	3	1	1	3	1	3	1	3	1	3	3	3	1	3	1	3	1	1	1	1	1	3	1	3	-1	3	3	3	1
32	3	1	3	1	-1	1	1	1	-1	-1	-1	-1	1	-1	1	-1	-1	-1	1	-1	-1	-3	-1	-1	-1	-1	-1	-1	-1	1	1	-1

FIGURE 40. Walsh Transform of Figure 39.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	30	0	30	0	12	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	34	0	30	0	12	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	18	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	20	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

FIGURE 41. Walsh Transform of Figure 39 after Filtering.

The dynamic range of the PISA was tested by using aerial photo–transparencies (size expanded to cover the entire light–emitting surface of the plasma tube) containing manmade topographic features, plus background terrain. The dynamic range of the PISA was defined to be the saturated signal voltage divided by the RMS (root mean square) value of noise voltage appearing at the output of the PISA. The test results are shown in figures 42 through 49. Only figure 43 shows a marginally recognizable result, that is a marginally large decomposed coefficient of –37 compared tc other coefficients owing to background terrain and system noises (largest 19). The result thus may be identified as a piece of farmland resembling the Walsh function pattern; Wal (0, x) Wal (8, y). In the rest of the figures, no significant coefficients can be recognized. This indicates that the dynamic range of the PISA is poor. Two factors that caused the poor dynamic range of the PISA were identified. They are (1) the high–switching voltage (250 volts) of the Plasma tube resulting in high–switching noise and (2) the inability to isolate unwanted background scenes that indirectly contribute noise. The symmetry of the PISA responses was evaluated with four simple targets representing lower order Walsh functions; Wal (1, x) W (O, y), Wal (O, x) W (1, y), Wal (3, x) W (O, y), and Wal (O, x) W (3, y). Since Walsh functions are two valued functions of +1 and –1, any input pattern and its complement shall ideally yield responses of same magnitude, but opposite in sign. The symmetry test results are shown in figures 50 through 65. The shaded area of targets are transparent and the unshaded, opaque. It was discovered that the PISA gives larger positive outputs than negative ones for all four cases. This implies that either the analog coefficient processing circuitry is nonlinear or the normalization of the coefficients is not properly performed.

The time dependency, or temporal response, of the PISA is very important and was evaluated by repeatedly running the system for a fixed input pattern. In figures 66 through 73, the temporal responses are shown for targets representing a road inter–section and a vertical line road, respectively. More than 10 percent variation in one or more of the significant spectral coefficients was observed for both cases. The causes of poor temporal responses can be traced to the variation in switching noise, which in–directly results from the change of plasma lights intensity with time and the possible variation of stray light.

FIGURE 42. Aerial Photo–Transparency (1).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	81	9	15	13	-11	5	7	-9	-37	-1	7	3	3	1	5	1	5	7	3	-5	-5	1	-1	5	-7	-7	3	3	9	5	7	3
2	13	1	-1	5	-1	3	-3	1	-1	1	5	1	1	-1	1	-3	3	1	1	-5	-5	-1	1	-3	-1	-5	1	1	1	1	-1	-1
3	19	5	9	9	1	7	5	1	3	3	7	5	7	3	5	5	9	7	5	-1	1	3	3	3	1	1	5	5	9	9	7	7
4	17	7	11	11	3	11	7	3	9	7	9	7	7	5	7	7	7	9	7	3	3	5	7	5	5	5	7	9	11	9	9	9
5	13	3	3	9	-1	7	1	1	3	1	5	5	5	1	3	1	3	5	3	-1	-3	-1	1	-1	-1	-3	3	3	3	5	3	3
6	13	3	1	5	-3	3	-1	-1	1	-3	3	-1	3	-3	1	-1	3	1	1	-5	-5	-5	-1	-3	-3	-5	-3	-1	-1	1	-1	-1
7	15	5	3	7	1	5	3	-1	1	-1	5	3	5	1	5	-1	1	5	1	-3	-3	-3	-1	-1	-1	-3	-1	1	1	3	1	1
8	17	7	7	9	1	7	3	1	1	1	5	3	5	3	5	3	5	5	3	-1	-1	-1	1	-1	1	-3	1	1	3	5	1	3
9	15	3	3	7	-1	5	3	-1	3	1	5	3	5	-1	3	1	3	3	3	-3	-3	-3	1	1	-1	-3	1	1	3	3	-1	1
10	15	7	5	13	3	7	3	3	3	3	9	3	7	3	5	3	5	7	3	-1	-1	1	1	1	-1	-1	1	5	5	7	5	5
11	15	5	5	11	1	7	3	1	1	1	7	5	5	-1	3	1	3	5	3	-1	-1	-1	1	1	1	-1	1	3	5	1	3	1
12	13	3	3	7	-3	5	1	-1	1	1	5	1	3	1	3	-1	3	1	1	-5	-3	-5	-1	-1	-1	-3	-1	1	1	3	-1	1
13	9	3	3	7	-1	5	1	1	3	-1	5	1	3	-1	3	1	5	5	3	1	-3	-1	3	1	1	-1	1	3	1	5	3	3
14	9	-3	-3	-1	-5	-1	-3	-5	-5	-5	1	-3	-1	-5	-1	-5	-3	-1	-3	-7	-7	-5	-5	-5	-3	-7	-3	-3	-1	-1	-3	-3
15	9	-1	-3	1	-7	-3	-5	-9	-9	-5	-3	-3	-5	-7	-3	-9	-5	-3	-5	-9	-9	-7	-5	-7	-7	-11	-5	-5	-3	-3	-5	-3
16	11	-5	-5	-1	-9	-5	-7	-11	-9	-9	-5	-7	-7	-11	-7	-11	-7	-7	-9	-13	-13	-13	-9	-9	-13	-13	-9	-9	-9	-5	-9	-7
17	13	3	3	5	-3	1	-1	-3	-1	-3	3	-1	1	-3	-1	-3	-1	-1	-1	-5	-7	-5	-5	-3	-5	-7	-5	-3	-3	-3	-3	-3
18	13	1	3	7	-1	5	-1	-1	1	-3	1	-1	3	-3	-1	-3	-1	-1	-3	-5	-7	-5	-5	-5	-5	-7	-3	-3	-3	-1	-3	-5
19	9	1	1	5	-3	3	-3	-1	-1	-1	3	-1	1	-3	-1	-3	-1	1	-3	-7	-5	-5	-5	-5	-5	-7	-3	-3	-3	-1	-3	-5
20	13	5	5	9	-1	5	3	1	3	-1	5	1	3	-1	3	-1	3	3	1	-3	-3	-3	-1	-3	-3	-5	-3	-1	-1	1	-1	-1
21	11	1	1	3	-5	-1	-1	-3	-5	-3	-1	-3	-3	-5	-1	-5	-3	-1	-3	-7	-9	-7	-5	-5	-7	-9	-5	-3	-5	-3	-3	-7
22	11	1	1	3	-3	1	-1	-3	-3	-1	-1	-3	-1	-3	-1	-3	-1	-1	-3	-7	-9	-7	-3	-7	-7	-9	-3	-5	-3	-1	-3	-3
23	9	1	-1	3	-5	1	-1	-3	-5	-3	1	-3	-1	-5	-1	-7	-3	-3	-3	-9	-7	-7	-5	-5	-7	-9	-7	-3	-3	-3	-5	-3
24	15	-1	-3	1	-5	-1	-3	-7	-3	-5	-1	-3	-1	-5	-3	-5	-3	-1	-5	-9	-11	-7	-7	-7	-9	-9	-5	-5	-5	-3	-3	-5
25	13	5	3	7	-1	5	1	3	3	-1	5	1	3	1	1	1	3	3	3	-3	-3	-1	-1	-1	-1	-3	-1	-1	1	3	1	-1
26	13	3	1	5	-3	3	-1	-3	-3	-3	1	-1	1	-3	1	-3	-1	-1	-3	-7	-7	-7	-3	-3	-5	-7	-5	-3	-1	-1	-5	-3
27	15	9	9	9	5	9	5	1	5	1	7	1	5	1	5	3	5	5	3	-3	-1	-1	1	-1	-3	-3	1	3	1	5	3	3
28	19	7	5	7	1	7	3	1	3	1	5	3	3	-1	1	-1	1	1	1	-3	-5	-3	-1	-3	-3	-5	-1	-1	-1	1	-1	-3
29	15	7	5	9	1	7	3	3	1	3	7	3	5	1	3	1	3	3	3	-3	-5	-3	-1	-3	-3	-5	-1	-1	-1	1	-1	1
30	15	5	5	7	-1	5	3	-1	1	1	3	1	3	-1	3	1	3	1	-1	-3	-5	-1	-1	-3	-5	-5	-3	-3	-3	-1	-3	-3
31	13	7	7	11	3	5	5	3	5	5	9	7	7	5	5	3	7	7	5	1	-1	1	3	1	3	1	3	5	5	5	3	3
32	15	3	3	5	-1	5	1	-1	1	1	3	1	3	1	3	1	3	3	3	-3	-3	-1	-1	-1	-1	-3	1	1	1	1	1	1

FIGURE 43. Walsh Transform of Figure 42.

FIGURE 44. Aerial Photo–Transparency (2).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	48	6	8	0	-6	-2	-2	-8	-4	-4	2	-2	-2	-4	0	-4	0	2	0	-2	-6	-4	-2	2	0	-4	2	2	6	0	2	0
2	-2	2	-2	2	-4	-4	-4	-6	-2	-4	-2	-4	-2	-4	-2	-4	-2	-2	-4	-4	-4	-2	-4	-4	-4	-4	-2	-4	-2	0	-2	-2
3	12	2	2	4	-2	-2	0	-4	-2	0	2	-2	0	-4	2	-4	-2	0	0	-4	-4	-4	-2	-2	-2	-4	0	-2	0	0	-2	0
4	8	2	4	4	2	2	2	2	4	2	4	2	2	0	2	0	2	2	2	-2	0	0	2	-2	0	-2	2	0	2	2	2	0
5	10	2	2	2	0	0	2	-4	2	2	2	0	2	2	2	-2	2	0	0	-2	-2	-2	-2	-2	-2	-4	0	-2	0	-2	0	-2
6	6	0	2	2	0	2	2	-2	0	0	2	0	0	-2	0	-2	0	0	-2	-2	-4	-4	-4	-2	-4	-4	-2	-4	-2	-2	-2	-4
7	8	0	0	4	0	2	2	-2	2	0	2	0	0	0	0	-4	2	2	0	-2	-2	-2	0	-2	-2	-2	0	-2	0	0	0	-2
8	8	4	4	2	0	4	2	-2	0	2	2	0	2	0	4	-2	2	2	2	0	0	0	2	0	0	-2	2	0	2	0	0	0
9	8	2	2	2	0	2	2	0	8	6	2	2	2	2	2	0	2	2	2	0	0	-2	0	-2	0	-4	0	0	2	2	0	0
10	10	2	4	4	2	4	2	0	2	2	4	2	2	0	2	-2	2	2	2	0	-2	0	2	2	0	-2	2	0	2	0	2	0
11	6	2	4	4	2	4	2	-2	2	2	4	0	2	2	2	0	2	2	2	0	-2	-2	0	0	2	0	2	2	2	2	0	10
12	8	2	2	4	2	2	2	0	2	2	2	0	2	0	2	-2	2	4	2	-2	-2	-2	0	-2	-2	-2	0	0	0	2	2	0
13	10	4	4	4	0	2	2	0	2	2	6	2	2	2	2	0	2	2	2	0	-2	0	2	2	0	-2	2	2	2	2	0	0
14	10	2	2	4	0	2	0	-2	0	0	2	0	0	0	0	-2	2	0	0	-4	-4	-4	-2	-4	-2	-4	0	-2	0	0	-2	-2
15	10	2	2	2	2	2	2	-2	2	2	2	0	0	0	2	-2	0	2	0	-4	-2	-2	0	-2	-2	-4	0	-2	0	0	0	-2
16	12	2	2	2	0	2	2	-4	0	-2	2	0	0	-2	0	-2	0	-2	-2	-4	-4	-2	-2	-2	-4	-6	-2	-4	-2	-4	-4	-4
17	10	4	6	6	4	4	4	2	6	2	6	2	4	2	4	2	6	4	4	0	0	2	2	0	0	0	2	2	2	2	2	0
18	10	4	4	6	2	4	2	2	2	2	8	2	4	2	6	2	4	2	4	0	0	2	2	2	2	0	2	2	2	2	0	2
19	8	2	2	4	2	2	2	0	2	2	4	4	2	2	4	0	4	2	2	0	0	0	2	0	2	2	4	2	2	2	2	2
20	12	2	4	4	2	4	2	0	2	2	4	2	2	4	4	0	4	4	6	2	0	2	4	2	2	0	4	2	4	4	4	4
21	6	2	2	2	0	0	0	-2	0	-2	2	0	2	0	0	-2	2	2	-2	-2	-2	-2	0	-2	0	-4	2	0	2	0	2	-2
22	6	2	0	2	0	0	0	-2	0	-2	2	-2	0	-2	0	-2	0	2	0	-4	-4	-2	-2	-2	-2	-2	0	0	0	0	0	-2
23	6	2	0	2	0	2	0	-2	-2	0	2	0	0	-2	0	-4	0	0	0	-4	-4	-4	-2	-2	-2	-2	-2	-2	0	0	-2	0
24	8	2	0	2	-2	0	-2	-4	-2	-2	0	-2	-2	-2	0	-4	0	-2	-2	-4	-4	-4	-2	-4	-4	-4	-2	-2	-2	-2	-2	-2
25	10	2	4	2	0	4	2	0	2	4	4	2	2	2	2	0	2	2	2	0	0	0	0	0	2	-2	2	2	2	2	2	2
26	6	-2	2	2	0	0	0	-2	0	0	2	0	-2	-2	0	-2	0	0	0	-4	-4	-2	-2	-2	-2	-4	0	-2	0	-2	0	-2
27	6	4	2	4	2	2	4	0	4	2	4	2	2	2	2	2	2	2	2	0	-2	0	2	0	0	-2	4	2	2	2	2	0
28	8	2	2	2	0	0	2	-2	0	0	2	0	0	-2	0	-4	2	0	0	-2	-2	-2	-2	-2	-2	-4	-2	0	0	0	0	-2
29	6	0	2	2	-2	2	0	-2	0	0	2	0	2	-2	2	-2	2	0	2	-2	-4	-2	2	-2	0	-2	0	0	0	0	-2	-2
30	6	-2	0	2	-4	0	-2	-4	-2	-2	0	-2	-2	-2	-2	-4	-2	-2	0	-4	-4	-4	-2	-4	-4	-4	0	-2	0	-2	-2	-2
31	4	0	2	2	0	2	0	-2	0	0	2	0	2	0	0	0	2	0	0	-2	-2	-2	0	0	0	-2	2	0	2	2	2	0
32	6	0	0	0	-2	-2	-2	-6	-4	-4	0	-2	-2	-4	-2	-4	-2	-2	-2	-4	-4	-4	-2	-4	-4	-4	0	-2	-2	-4	-2	-2

FIGURE 45. Walsh Transform of Figure 44.

FIGURE 46. Aerial Photo–Transparency (3).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	99	7	-5	15	-23	-1	-5	-15	-1	-3	9	-3	-11	-1	-3	-7	1	-3	1	-9	-9	-5	-3	1	-1	-13	1	1	1	-1	-5	-1
2	21	1	1	3	-5	1	-1	-9	-3	-3	-1	-1	-5	-3	-5	-9	-3	-1	-3	-9	-11	-5	-7	-9	-7	-9	-7	-7	-5	-5	-7	-5
3	-1	5	-11	13	-7	7	-1	-3	9	5	13	5	-1	5	-1	3	3	5	3	-3	1	3	3	3	3	1	5	1	1	3	-1	-1
4	23	13	15	15	9	13	13	7	9	11	13	11	11	9	9	5	9	11	9	3	3	7	7	7	7	7	9	7	7	11	7	7
5	9	9	-1	11	1	9	3	-3	7	5	11	5	1	5	5	-1	5	5	3	-1	-1	1	1	3	-1	-1	3	3	1	3	-1	1
6	21	7	3	11	1	7	3	-3	5	3	5	1	3	1	1	-3	1	1	-1	-5	-5	-1	-3	-3	-5	-5	-3	-3	-5	-1	-5	-3
7	13	11	3	15	5	13	5	3	11	9	15	7	5	7	7	1	7	7	5	1	-1	3	3	3	1	-1	3	3	-1	3	-1	3
8	19	11	7	17	5	13	9	5	11	9	15	11	7	7	9	5	11	9	7	3	3	5	5	5	5	1	5	5	3	7	1	3
9	25	7	11	13	5	11	11	5	7	11	13	9	9	7	11	3	9	9	9	3	1	3	7	5	5	3	7	7	5	9	5	5
10	19	11	11	15	5	13	9	5	11	11	13	11	11	9	11	7	11	11	9	7	5	7	9	9	9	7	11	11	11	13	7	9
11	23	9	9	11	5	11	7	-1	5	5	7	7	5	5	9	1	9	9	7	1	-1	5	3	3	3	1	7	5	5	9	7	7
12	17	5	7	11	1	7	5	-1	3	5	7	5	1	3	3	1	5	3	3	-1	1	1	3	3	1	-1	5	3	3	5	1	3
13	9	5	3	11	1	11	3	1	7	7	9	5	3	5	3	1	5	7	5	1	1	3	5	3	3	3	7	5	3	7	3	3
14	17	3	3	3	-3	5	1	-5	1	1	5	1	1	-1	-1	-3	1	-1	-1	-5	-7	-3	-3	-1	-3	-5	-1	-1	-1	-1	-3	-3
15	9	-1	-5	3	-7	-1	-3	-9	-1	-1	3	-1	-3	-3	-5	-5	-1	-1	-5	-9	-11	-5	-7	-5	-5	-7	-3	-5	-5	-3	-7	-5
16	17	-1	-3	-1	-9	-1	-5	-13	-5	-5	-3	-5	-7	-7	-5	-9	-5	-5	-7	-13	-13	-11	-9	-9	-11	-13	-7	-7	-9	-9	-11	-9
17	15	7	5	13	3	9	3	-1	7	3	9	5	5	1	5	-1	7	7	3	-1	-1	1	1	1	-1	-1	1	3	1	5	1	1
18	13	5	3	7	1	7	5	-1	5	5	9	3	3	3	3	-1	5	5	5	-3	-3	-1	3	1	-1	-3	1	1	-1	1	-1	1
19	11	5	1	7	-1	5	3	-3	3	3	9	5	1	3	3	-1	5	3	1	-3	-3	1	1	-1	-1	-3	1	1	1	3	-3	1
20	11	5	1	9	-1	7	1	-1	5	7	9	5	3	5	5	1	5	5	3	-3	-1	3	5	3	1	1	5	5	3	5	1	3
21	9	-1	-3	1	-7	1	-3	-9	-5	-1	-1	-3	-3	-5	-3	-5	-1	-3	-1	-7	-9	-7	-7	-5	-5	-7	-3	-3	-3	-1	-5	-5
22	11	-1	-1	-1	-7	-1	-3	-9	-5	-5	-3	-3	-5	-5	-5	-9	-3	-3	-5	-9	-9	-5	-5	-7	-7	-9	-3	-5	-5	-1	-5	-5
23	7	-3	-3	-1	-11	-3	-5	-11	-7	-5	-5	-7	-9	-9	-9	-11	-7	-7	-7	-11	-11	-9	-7	-9	-9	-13	-7	-9	-7	-5	-9	-7
24	13	-5	-3	-3	-9	-3	-7	-13	-7	-9	-5	-9	-9	-9	-9	-13	-9	-7	-9	-13	-15	-11	-9	-13	-13	-13	-11	-11	-11	-7	-11	-11
25	13	1	3	3	-3	1	1	-7	-1	-1	1	-3	-3	-5	-1	-7	-3	-1	-5	-7	-11	-7	-7	-7	-7	-11	-7	-7	-7	-5	-5	-7
26	13	-1	-3	1	-7	-1	-5	-9	-3	-3	-1	-3	-5	-7	-5	-9	-5	-5	-9	-13	-13	-9	-11	-11	-11	-11	-9	-11	-9	-7	-11	-11
27	13	5	7	7	1	5	3	-5	1	1	5	1	-1	-1	1	-5	1	1	1	-5	-7	-3	-3	-5	-5	-7	-5	-3	-5	-1	-7	-5
28	15	3	1	5	-3	3	-1	-5	-1	-3	3	-3	-3	-3	-3	-5	-1	-1	-3	-7	-9	-5	-5	-5	-5	-9	-7	-5	-7	-3	-7	-5
29	5	-1	-3	1	-7	3	-3	-7	-3	-3	1	-3	-5	-5	-3	-9	-3	-5	-5	-7	-11	-7	-7	-7	-7	-9	-5	-7	-11	-5	-9	-7
30	9	-3	-5	1	-9	-1	-5	-9	-3	-3	-1	-3	-5	-5	-5	-9	-5	-5	-7	-11	-11	-7	-7	-7	-7	-11	-7	-7	-9	-5	-11	-9
31	5	5	-1	5	-3	5	-1	-5	1	3	7	1	-1	-1	-1	-5	3	1	1	-5	-5	-3	-1	-3	-3	-5	-1	-1	-3	-1	-5	-3
32	13	1	-1	3	-7	1	-5	-7	-3	-3	1	-1	-3	-5	-3	-7	-3	-5	-5	-9	-9	-7	-5	-5	-7	-9	-5	-5	-7	-3	-9	-5

FIGURE 47. Walsh Transform of Figure 46.

FIGURE 48. Aerial Photo–Transparency (4).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	52	-4	-10	-6	-2	6	4	0	2	6	6	6	0	2	2	0	2	4	0	0	-4	0	0	4	2	-6	2	4	4	-2	-2	0
2	6	-2	0	4	0	2	2	0	2	0	2	0	0	0	0	-2	2	0	0	-2	-2	-2	-2	-2	0	-4	-2	-2	-2	-2	-2	-2
3	10	4	2	6	0	6	6	2	2	4	6	2	2	6	4	2	4	4	4	-2	-2	2	4	2	2	0	4	2	0	4	2	2
4	8	6	6	8	4	8	8	4	4	6	8	6	4	6	8	4	6	8	8	2	2	4	6	4	4	4	6	6	4	6	6	6
5	6	2	2	6	2	6	2	0	0	2	4	4	2	2	4	0	4	2	4	0	0	2	2	4	2	0	2	4	2	2	2	2
6	6	0	0	2	-2	4	0	-2.	0	0	2	0	0	2	0	-2	0	2	2	-2	-4	2	0	0	-2	0	0	0	0	2	0	0
7	4	2	2	4	0	4	4	0	0	2	4	0	0	0	2	0	2	2	2	-2	-4	0	0	0	-2	0	0	2	0	2	0	0
8	8	2	2	4	0	6	2	0	2	0	4	2	2	2	2	0	2	4	2	-2	-2	2	0	2	-2	-2	2	2	0	0	2	0
9	8	2	2	4	0	4	2	0	0	2	2	2	0	2	2	0	2	2	0	0	-2	0	0	0	0	-2	2	2	0	0	0	-2
10	6	4	2	6	2	6	4	2	2	4	4	4	2	4	4	0	2	4	2	0	-2	0	2	2	0	0	2	2	2	2	0	2
11	6	2	2	4	0	4	2	2	2	4	4	2	0	2	2	0	2	4	2	0	-2	2	0	0	0	-2	2	0	2	2	2	0
12	8	2	2	4	0	4	2	0	0	2	2	2	2	2	4	0	2	4	2	-2	-2	0	2	0	-2	-2	2	2	0	2	0	0
13	6	2	2	4	0	6	2	0	0	2	2	4	2	2	4	0	4	4	2	0	0	2	2	2	0	0	2	2	0	2	0	0
14	4	-2	-2	0	-4	2	0	-2	-2	-2	2	-2	-2	-2	2	-2	0	-2	0	-4	-4	-2	0	-2	-2	-2	-2	-2	-2	-2	-2	-2
15	2	-2	-4	0	-4	0	-2	-2	-2	-2	0	-2	-2	-2	0	-2	-2	0	-2	-4	-4	-2	-2	-2	-4	-4	-2	-2	-2	0	-2	-2
16	4	-4	-4	-4	-6	-2	-4	-6	-6	-6	-2	-4	-6	-4	-2	-6	-4	-4	-4	-6	-8	-6	-6	-4	-6	-6	-6	-2	-4	-4	-6	-6
17	4	-2	0	2	-2	0	0	-4	-2	-2	2	0	-2	0	0	-2	-2	2	0	-2	-4	-2	-2	0	-2	-2	0	-2	0	0	0	-2
18	2	0	-2	0	-2	0	0	-2	-2	0	0	0	-2	-2	-2	-2	-2	0	-2	-4	-6	-2	-2	-2	-4	-4	-2	-2	-2	-2	-2	-2
19	4	0	-2	0	-2	2	0	-2	-2	0	0	-2	-2	-2	-2	-4	-2	-2	-2	-4	-6	-2	-2	-4	-4	-6	-2	-2	-4	-2	-2	-2
20	6	2	0	4	-2	2	2	0	-2	0	2	0	-2	0	2	-2	0	0	-2	-4	-4	-2	-2	-2	-2	-4	-2	-2	-2	-2	-2	-2
21	6	0	-2	0	-4	2	-2	-4	-4	-2	0	-2	-2	-2	-2	-2	-2	-2	0	-4	-6	-4	-4	-2	-6	-6	-4	-4	-6	-4	-6	-4
22	4	0	-2	0	-4	2	0	-2	-2	-2	0	-2	-2	-2	-2	-4	-2	0	-2	-4	-6	-2	-2	-2	-4	-4	-4	-2	-4	-2	-4	-2
23	2	-2	-2	0	-4	2	0	-4	-2	-2	0	-2	-2	-4	-2	-4	-2	-2	-2	-4	-6	-2	-4	-2	-6	-6	-4	-2	-2	-2	-4	-2
24	4	-2	-2	0	-2	0	-2	-4	-2	-2	0	-2	-4	-4	-2	-4	-4	-2	-2	-6	-8	-2	-4	-4	-4	-4	-2	-4	-4	-4	-4	-6
25	6	2	2	4	0	4	4	-2	2	0	2	2	0	0	2	0	2	2	0	-2	-2	0	0	0	0	-2	0	0	0	2	0	0
26	4	-2	-2	0	-2	0	0	-2	-2	0	2	-2	-2	-2	-2	-2	-2	0	-2	-4	-6	-2	-2	-2	-4	-4	-2	-2	-2	-2	-2	-2
27	4	2	2	4	0	4	2	2	2	2	2	2	0	0	2	2	2	4	2	-2	-4	0	0	0	0	-2	0	2	-2	2	-2	0
28	6	2	0	2	0	4	2	-2	-2	2	2	0	-2	0	0	-2	0	2	-2	-4	-4	0	0	-2	-2	-4	-2	-2	-2	0	-2	-2
29	8	2	0	2	0	4	0	-2	0	0	0	2	0	0	0	-2	0	0	0	-4	-4	-2	-2	-2	-2	-4	-2	-2	-2	0	-2	-2
30	8	2	0	2	-2	4	2	-2	0	0	4	0	-2	-2	0	-4	-2	-2	-2	-4	-6	-2	-2	-2	-2	-4	-4	-2	-4	-2	-4	-2
31	6	6	4	8	4	8	4	2	4	4	4	2	4	2	4	2	4	4	4	0	-2	2	0	0	-2	-2	2	2	0	2	0	0
32	10	2	4	4	2	6	4	0	2	2	4	2	2	2	2	0	0	2	0	-2	-4	-2	0	0	-2	-2	0	0	-2	0	-2	-2

FIGURE 49. Walsh Transform of Figure 48.

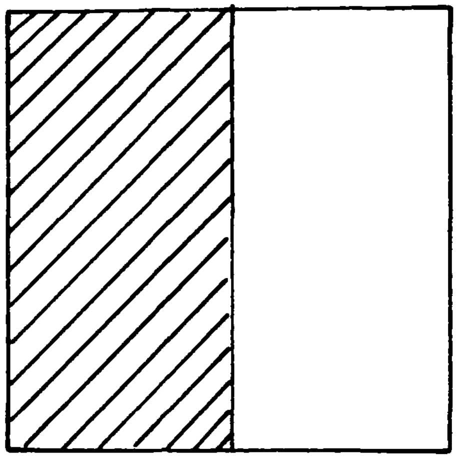

FIGURE 50. Target Representing Wal (1, x) Wal (0, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	84	84	-16	-18	-36	-40	-32	-34	-26	-24	-18	-14	-20	-22	-16	-18	-8	-8	-14	-16	-18	-20	-10	-12	-14	-16	2	-2	0	2	2	0
2	18	10	2	4	0	-6	-2	-8	2	-4	4	0	-2	-6	0	-6	4	-4	-2	-8	-4	-10	-2	-8	-6	-10	0	-4	0	-2	-2	-4
3	24	12	14	10	6	0	4	-4	6	2	10	2	4	0	4	-2	18	6	4	-4	-2	-4	2	-2	0	-6	8	0	6	0	8	0
4	24	10	16	16	12	8	8	2	12	8	16	10	8	6	10	4	14	8	8	0	6	-2	8	2	4	-2	10	4	10	6	8	4
5	22	10	12	8	8	4	6	-2	8	4	14	4	8	0	8	0	12	4	4	-4	0	-4	4	-2	0	-6	6	2	4	2	4	0
6	26	12	10	10	8	2	2	-2	6	2	10	4	4	2	6	0	8	4	2	-4	-2	-4	2	-4	0	-6	8	0	2	0	4	-2
7	22	12	12	12	10	4	4	0	8	4	12	8	10	6	8	2	14	8	8	0	4	-2	6	0	4	-4	10	2	6	6	8	2
8	22	10	12	10	8	4	6	-2	8	4	14	6	8	2	8	0	12	8	8	2	4	-2	8	2	4	-2	10	4	8	6	10	4
9	22	8	10	6	4	2	2	-2	6	4	12	6	6	2	6	2	10	8	6	[illegible]	2	0	6	2	2	-4	12	4	8	6	12	4
10	22	10	12	12	10	4	4	-2	8	2	12	6	10	4	8	2	14	4	8	0	4	-2	6	-2	6	-2	12	6	12	8	12	4
11	20	10	10	6	6	0	4	-4	6	0	10	4	6	-2	6	-2	8	4	4	0	0	-6	4	-2	0	-4	8	2	6	4	8	0
12	22	6	10	4	4	0	2	-6	4	0	8	2	4	0	4	-2	6	2	2	-2	0	-6	4	-4	0	-4	8	0	4	0	6	-2
13	18	6	10	10	6	4	2	-2	8	2	12	4	8	2	6	0	10	4	6	-2	2	-6	4	-2	2	-4	8	2	6	4	8	2
14	20	8	8	6	2	-2	0	-6	2	-2	8	0	2	-4	2	-2	4	0	0	-4	-2	-6	0	-6	-4	-8	2	-2	2	0	2	-2
15	18	6	8	2	2	-2	-2	-8	2	-2	6	0	0	-4	0	-6	4	0	0	-6	-6	-10	0	-6	-6	-10	2	-4	0	-2	2	-4
16	20	6	2	0	-4	-6	-8	-10	-4	-8	2	-4	0	-8	-2	-10	2	-6	-4	-12	-8	-12	-4	-12	-8	-10	-2	-8	-2	-4	0	-8
17	16	6	10	6	6	-2	0	-6	4	-2	10	0	2	-2	4	-2	8	2	2	-4	0	-6	2	-4	0	-8	4	-2	2	2	6	-2
18	16	4	6	4	2	0	0	-6	4	0	8	0	2	-2	2	-2	6	2	2	-4	-2	-8	2	-4	-2	-6	6	0	4	0	4	-2
19	14	4	2	2	0	-4	-4	-8	2	-2	6	-2	2	-4	2	-6	6	0	0	-6	-4	-6	0	-6	-2	-6	4	-2	2	2	2	-2
20	14	2	6	4	0	-4	-2	-8	2	-6	6	0	2	-4	2	-4	6	0	2	-6	-2	-8	2	-4	-2	-8	6	-2	6	2	4	-2
21	14	2	2	0	-4	-8	-6	-12	-4	-8	0	-4	-4	-8	-2	-10	0	-4	-4	-10	-6	-12	-4	-10	-6	-12	0	-6	-2	-4	-2	-6
22	12	2	2	-2	-2	-6	-6	-12	0	-6	0	-6	-4	-8	-4	-12	0	-6	-4	-12	-8	-12	-4	-10	-8	-12	-2	-8	-4	-4	-2	-8
23	12	2	4	0	-2	-8	-6	-12	-4	-8	2	-4	-4	-8	-4	-10	0	-6	-8	-12	-10	-14	-6	-12	-8	-14	-2	-8	-4	-6	-2	-10
24	16	6	4	-2	-4	-6	-6	-10	-6	-8	-2	-6	-6	-8	-2	-10	0	-6	-4	-12	-10	-16	-6	-14	-8	-16	-4	-10	-6	-8	-4	-10
25	14	6	6	6	4	-2	0	-4	4	-2	8	0	4	-4	2	-4	4	0	2	-6	-4	-8	0	-6	-4	-8	2	-4	-2	-2	0	-6
26	18	4	6	0	2	-6	-2	-8	0	-4	4	-2	0	-6	-2	-6	2	-4	-4	-10	-6	-12	-2	-10	-6	-10	2	-8	0	-6	-2	-10
27	16	6	10	6	6	2	0	-4	4	0	10	2	4	0	6	-2	6	2	4	-6	-2	-8	2	-4	0	-6	6	0	4	0	4	0
28	16	6	8	4	2	-2	-2	-6	2	-2	6	-2	2	-4	2	-4	6	0	0	-6	-4	-8	0	-6	-4	-10	2	-4	0	-2	2	-4
29	16	2	6	2	0	-4	-2	-8	0	-2	6	0	2	-4	-2	-4	2	-2	-2	-6	-4	-8	0	-6	-4	-10	2	-4	0	-4	0	-6
30	16	6	4	2	0	-4	-4	-8	0	-6	4	-4	-2	-6	0	-8	2	-4	0	-8	-6	-12	-4	-8	-6	-12	0	-4	-2	-4	-2	-6
31	16	6	8	6	6	0	0	-6	4	-2	8	0	2	0	4	-4	8	2	4	-4	-4	-6	2	-2	-2	-8	6	0	2	2	6	-2
32	18	4	6	4	0	-2	-4	-8	2	-4	4	-2	-2	-6	-2	-6	2	-2	0	-8	-4	-10	-2	-8	-4	-10	2	-6	0	-4	0	-6

FIGURE 51. Walsh Transform of Figure 50.

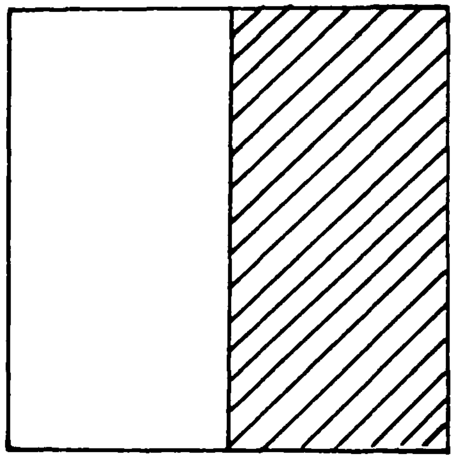

FIGURE 52. Target Representing Complement of Wal (1, x) Wal (0, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	82	-72	36	34	12	34	30	10	14	16	16	8	10	12	16	4	8	4	12	4	0	6	-2	6	12	-6	-4	0	4	-4	-4	-2
2	6	-8	-6	2	-8	6	-4	-4	-6	-2	-6	-6	-8	-2	-6	-6	-10	-4	-6	-8	-12	-4	-10	-6	-8	-8	-14	-6	-10	-4	-14	-4
3	8	-6	0	6	-4	10	4	2	0	2	0	0	-2	0	0	-2	-4	2	-2	-4	-8	2	-6	-2	-2	-2	-8	-2	-6	0	-8	-4
4	8	12	4	10	0	14	8	8	6	6	6	6	4	8	4	4	2	4	6	0	-2	6	0	6	2	6	-2	0	0	4	-4	2
5	4	2	0	8	-4	12	4	2	0	4	2	4	2	4	2	0	-2	4	2	0	-6	4	-4	2	-4	2	-6	2	-4	2	-6	0
6	8	-4	-2	4	-6	10	2	0	-2	2	-2	0	-4	2	-2	-4	-4	0	0	-4	-6	2	-6	-4	-2	-2	-8	-2	-4	-2	-8	-2
7	4	-2	-2	4	-4	10	4	2	0	2	0	0	0	0	2	-2	-2	0	2	-2	-6	4	-4	2	-2	0	-4	-2	-4	2	-6	0
8	8	2	0	10	-4	10	4	6	2	4	4	4	0	4	2	0	-2	4	2	0	-6	4	-2	4	0	2	-4	2	-2	4	-4	2
9	8	0	0	8	-2	12	4	4	0	4	0	4	0	4	2	0	-2	4	2	0	-4	4	-2	0	0	0	-4	2	-4	4	-4	2
10	8	6	2	12	-2	14	8	6	4	6	4	6	4	4	6	8	0	8	4	4	-4	8	-2	6	2	4	-4	4	-2	6	-4	4
11	8	2	2	10	-2	12	6	4	2	6	2	4	0	6	2	2	-2	4	2	2	-4	6	-2	4	2	2	-4	2	-2	2	-4	2
12	10	4	2	8	-4	14	4	4	0	6	2	2	0	4	4	-2	-2	4	0	-2	-6	4	-2	2	0	2	-4	0	-2	2	-4	0
13	10	10	4	14	2	16	8	6	6	8	6	6	4	8	4	4	0	6	4	4	-2	8	-2	6	0	4	-4	4	-2	6	-4	4
14	14	0	2	8	-4	12	6	4	0	4	2	4	0	4	2	0	-2	2	2	-2	-6	2	-2	2	-2	-2	-6	-2	-4	0	-8	-2
15	10	-2	-2	6	-6	10	4	2	0	4	0	2	0	2	2	-2	-2	2	0	-2	-6	2	-6	0	-2	0	-6	-2	-6	0	-6	0
16	10	-6	-4	2	-8	4	0	-2	-2	0	-2	-2	-4	0	-2	-4	-4	0	-4	-4	-10	0	-8	-2	-6	-4	-8	-2	-6	-2	-10	-4
17	8	6	2	10	-2	14	6	6	2	8	4	4	4	6	4	4	2	6	6	4	0	8	0	6	4	4	0	4	2	8	0	6
18	8	2	2	8	-2	12	6	4	2	4	2	4	2	4	4	0	2	4	4	2	-4	6	0	6	2	4	-2	4	0	6	-2	4
19	6	0	-2	8	-4	12	4	2	0	4	0	2	0	4	2	-2	-2	4	0	0	-6	6	-2	4	0	4	-4	0	-2	4	-4	2
20	8	6	2	12	-2	12	4	4	2	6	2	6	2	6	4	4	0	6	4	2	-4	6	-2	4	4	4	-2	4	-2	8	-2	6
21	6	-2	-4	4	-8	8	0	-2	-4	0	-2	-2	-4	0	-2	-2	-6	0	0	-4	-10	0	-6	-2	-6	-2	-8	-2	-6	-2	-8	0
22	6	-2	-4	4	-6	8	0	0	-2	2	-4	-2	-4	0	-4	-2	-6	0	-2	-4	-8	2	-6	-2	-4	-2	-8	-4	-8	-2	-8	-2
23	4	-4	-6	4	-8	8	0	-2	-4	2	-2	-2	-4	-2	-2	-4	-6	-2	-2	-6	-8	0	-8	0	-4	-2	-10	-4	-8	0	-10	-4
24	6	-6	-6	4	-8	4	0	-4	-4	-2	-4	-4	-6	-2	-4	-4	-8	-4	-4	-6	-12	0	-8	-4	-6	-4	-10	-6	-8	-2	-10	-4
25	8	4	2	8	-2	12	6	4	0	6	2	4	0	4	6	2	-2	4	2	0	-4	6	-4	4	0	2	-4	2	-2	4	-4	2
26	6	-4	-4	4	-6	8	2	0	-4	0	-2	-2	-4	-2	-2	-4	-6	0	0	-4	-8	2	-8	0	-4	-2	-10	-4	-6	0	-8	-2
27	4	4	0	6	-4	8	4	4	0	4	4	4	0	4	4	4	-2	6	2	2	-4	6	-2	4	0	4	-2	2	-2	4	-6	2
28	6	-2	-4	4	-8	8	-2	-2	-4	0	-2	-2	-2	2	-2	-4	-4	2	0	-4	-6	2	-4	2	-2	0	-4	-2	-4	2	-6	2
29	2	-2	-4	2	-8	4	-2	-4	-6	-4	-4	-2	-4	-2	-4	-4	-6	-2	-4	-4	-8	0	-6	-2	-4	0	-10	-4	-6	2	-8	-2
30	2	-6	-6	0	-10	2	-4	-4	-8	-4	-6	-4	-8	-4	-6	-8	-10	-6	-6	-6	-12	-2	-10	-4	-8	-6	-10	-8	-8	-2	-10	-6
31	0	4	-2	4	-6	8	2	0	-4	2	-2	-2	-2	0	-2	-4	-6	-2	-2	-4	-10	0	-6	0	-4	-2	-6	-2	-8	0	-8	-2
32	4	-4	-4	2	-10	4	0	-2	-6	-2	-2	-4	-4	-2	-6	-6	-8	-4	-6	-8	-12	-2	-10	-6	-8	-4	-10	-6	-10	-4	-12	-6

FIGURE 53. Walsh Transform of Figure 52.

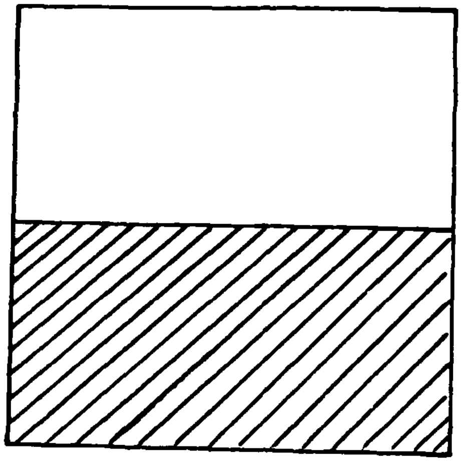

FIGURE 54. Target Representing Wal (0, x) Wal (1, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	87	3	-3	-1	-15	-3	-3	-15	-7	-5	-1	-7	-7	-7	-3	-11	-1	-3	-1	-9	-13	-7	-7	-7	-3	-13	-3	-3	1	-1	-3	-3
2	109	1	3	7	-11	-1	1	-11	-3	-5	3	-5	-5	-5	-1	-9	1	-3	-3	-9	-9	-9	-7	-5	-5	-11	-5	-3	-1	-3	-5	-3
3	9	7	11	13	9	11	11	5	9	11	13	9	7	9	11	7	9	11	11	3	3	7	7	7	5	5	9	5	7	9	7	5
4	5	9	11	13	7	11	9	7	9	7	9	9	9	7	9	5	11	11	9	5	3	7	9	5	7	3	9	7	7	11	7	7
5	3	1	1	5	-1	5	1	-1	3	1	5	1	3	-1	3	-1	3	1	3	-3	-1	1	-1	1	-1	-1	1	1	1	1	-1	1
6	-5	-1	-1	1	-3	1	-1	-5	-1	-1	1	-1	-1	-1	1	-3	1	1	1	-5	-5	-3	-3	-1	-3	-3	1	-1	-1	1	1	-1
7	3	1	1	5	-1	3	1	-3	1	1	3	1	1	1	1	-1	3	3	3	-1	-1	1	1	1	1	-1	1	1	1	3	1	3
8	-1	3	1	5	-3	3	-1	-1	-1	1	3	1	1	-1	1	-1	3	1	1	-3	-3	-1	-1	-1	-1	-1	1	1	1	3	-1	3
9	9	5	5	9	1	5	5	-1	3	3	5	1	3	3	5	1	3	3	3	-1	-3	1	-1	1	1	1	3	3	1	3	1	3
10	1	3	5	9	1	7	5	1	5	3	5	3	3	3	3	-1	1	3	3	-1	-1	-1	-1	-1	-1	-3	-1	-1	-1	1	-1	1
11	7	3	5	9	1	7	1	-1	3	3	5	3	3	1	1	-1	3	1	1	-5	-5	-3	-3	-1	-1	-5	-1	-1	-3	1	-1	-1
12	5	5	5	9	1	7	3	-1	3	3	5	1	3	3	3	-1	3	3	3	-3	-3	-1	-1	-3	-1	-3	-1	-1	-1	1	-1	-3
13	7	3	5	7	3	7	3	-1	3	1	5	3	1	1	3	-1	1	3	-1	-3	-5	-1	-1	-3	-1	-3	-1	-3	-1	1	-3	-3
14	-3	5	3	5	-1	5	1	-1	1	1	3	1	1	1	1	-1	1	1	1	-3	-3	-3	-1	-3	-1	-3	-1	-3	-1	1	-1	-1
15	3	-7	-5	-3	-11	-5	-7	-11	-7	-9	-3	-9	-7	-9	-7	-11	-7	-9	-7	-11	-13	-11	-11	-11	-11	-13	-11	-11	-11	-7	-11	-11
16	-1	-7	-5	-3	-11	-7	-7	-11	-7	-7	-5	-7	-7	-9	-9	-11	-9	-7	-9	-13	-13	-11	-11	-11	-9	-13	-7	-11	-11	-9	-9	-11
17	7	7	7	7	1	7	3	-1	3	3	5	3	3	1	5	1	3	1	3	-1	-3	-1	1	-1	1	-1	1	1	1	3	1	1
18	1	5	5	7	1	7	3	-1	3	3	5	1	3	1	3	-3	3	3	3	-1	-1	1	1	-1	-1	-1	1	1	-3	3	-1	1
19	7	7	7	9	3	7	5	3	5	3	7	5	5	3	5	1	5	7	3	1	-1	3	1	1	1	1	1	3	3	3	1	1
20	7	11	9	13	3	11	7	3	5	7	9	5	5	5	5	3	5	5	5	1	-1	1	3	1	1	-1	3	3	3	5	1	3
21	7	3	1	5	-3	3	1	-3	-1	-1	-1	-3	-3	-5	-3	-7	-3	-3	-3	-7	-11	-7	-7	-7	-7	-9	-5	-7	-7	-3	-7	-7
22	1	3	3	5	-3	3	-1	-5	-1	-3	1	-1	-1	-1	-1	-3	-3	-1	-3	-7	-9	-7	-7	-5	-7	-7	-5	-5	-5	-5	-7	-9
23	7	1	1	3	-5	3	-3	-3	-3	-1	-1	-3	-5	-3	-3	-5	-3	-3	-3	-7	-9	-7	-5	-7	-7	-11	-5	-9	-7	-5	-7	-7
24	1	1	-3	1	-7	1	-3	-5	-1	-3	-1	-3	-3	-5	-3	-7	-3	-5	-3	-7	-9	-7	-7	-7	-7	-7	-5	-5	-5	-5	-7	-7
25	9	3	5	7	1	5	5	-1	3	1	7	5	5	3	7	1	5	5	3	1	-1	3	1	1	1	1	3	1	3	3	3	3
26	1	3	3	5	-1	5	3	-1	1	1	3	1	1	-1	1	-1	1	3	3	-3	-3	-1	1	-1	-1	-3	3	1	3	3	1	1
27	5	7	5	9	3	7	3	1	7	3	7	5	7	3	5	1	5	5	5	-1	1	1	3	1	1	3	5	3	3	7	5	3
28	3	7	7	7	1	5	3	1	3	3	7	3	3	3	5	1	3	3	3	1	-1	1	1	1	-1	1	3	1	3	7	3	1
29	7	-1	1	3	-5	1	1	-5	-1	-1	1	-1	-1	-3	-3	-5	-3	-3	-1	-7	-7	-5	-3	-5	-7	-5	-3	-5	-3	-1	-3	-3
30	-3	1	-1	3	-5	-1	-5	-7	-3	-3	1	-3	-3	-5	-3	-7	-3	-3	-1	-9	-9	-7	-5	-7	-7	-5	-5	-5	-7	-1	-7	-5
31	3	3	3	7	1	3	1	-3	1	-1	5	-1	1	-1	1	-1	1	1	1	-3	-5	-3	-1	-3	-3	-3	-3	-1	-1	1	-1	-1
32	1	3	3	5	-1	5	1	-1	-1	3	5	1	1	1	3	-1	1	1	1	-3	-5	-3	1	-3	-3	-1	-1	-3	-1	1	-1	-3

FIGURE 55. Walsh Transform of Figure 54.

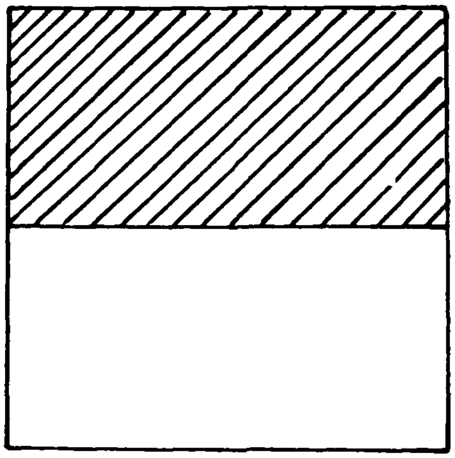

FIGURE 56. Target Representing Complement of Wal (0, x) Wal (1, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	81	9	5	-1	-9	3	3	-9	-1	-1	9	1	1	1	5	-3	5	3	3	-1	-7	-1	-1	5	3	-5	3	3	9	5	5	5
2	-81	-3	-5	1	3	1	-1	1	-1	-1	-1	1	-1	-1	-5	-1	-3	-1	-1	-3	-5	-3	-3	-5	-5	-1	-3	-5	-7	-3	-5	-5
3	21	1	1	3	-7	1	-3	-5	-3	-3	-1	-3	-3	-5	-1	-9	-1	-3	-3	-9	-9	-5	-5	-7	-7	-9	-5	-3	-5	-3	-3	-5
4	23	9	9	11	7	9	5	1	7	5	9	5	5	3	7	3	7	7	5	3	-1	3	3	3	1	1	3	3	3	7	3	5
5	15	5	5	7	1	7	5	3	3	5	7	5	3	3	5	1	5	5	3	-1	-1	1	1	1	1	-1	5	3	3	5	1	1
6	29	-1	1	5	-3	3	-1	-5	-1	-1	3	-1	-1	-3	1	-5	1	-1	-1	-5	-7	-5	-3	-3	-3	-5	-1	-1	-1	-1	-1	-1
7	11	1	1	3	-3	1	1	-3	-1	-1	3	-1	-1	-3	1	-5	1	1	-1	-5	-3	-3	-1	-1	-1	-3	-1	-1	-1	1	-3	-3
8	21	1	1	3	-3	1	-1	-5	1	-1	5	1	-1	-1	1	-3	1	1	1	-3	-7	-3	-1	-1	-1	-3	1	1	1	3	1	1
9	13	-1	-1	-1	-5	-3	-3	-7	-3	-7	-3	-5	-5	-7	-5	-7	-3	-5	-5	-9	-9	-7	-7	-7	-5	-7	-3	-5	-3	-3	-3	-5
10	21	5	1	7	-3	3	1	-3	1	1	5	1	-1	-3	1	-3	1	-1	1	-5	-3	-1	-1	-1	-3	-5	-1	-1	1	1	-1	-1
11	17	3	3	5	-3	3	1	-5	-1	-3	1	-3	-1	-3	-1	-5	-1	-1	-3	-5	-9	-5	-5	-3	-5	-7	-3	-1	-3	-1	-3	-1
12	23	3	3	5	-3	3	-1	-3	-1	-1	1	-1	-3	-3	-3	-7	-3	-3	-3	-7	-7	-5	-5	-5	-7	-7	-5	-5	-5	-5	-5	-7
13	15	7	7	9	1	7	3	1	5	5	7	5	5	3	5	1	5	3	5	-1	-1	-1	-1	-1	-1	-1	1	1	1	3	1	1
14	25	-1	1	1	-7	1	-3	-7	-3	-3	1	-5	-3	-5	-1	-7	-3	-5	-3	-9	-9	-7	-5	-7	-9	-9	-9	-7	-7	-5	-7	-7
15	15	5	7	7	1	5	5	1	3	3	5	3	3	3	3	-1	3	3	1	-1	-1	-1	1	-1	1	-1	1	1	1	3	1	-1
16	23	3	1	1	-5	1	-3	-7	-3	-3	1	-3	-3	-5	-3	-5	-1	-1	-3	-7	-9	-7	-7	-7	-7	-9	-5	-3	-3	-3	-7	-3
17	17	3	1	5	-1	3	1	-3	1	1	5	-1	1	-1	1	-5	1	1	1	-3	-5	-1	-3	-3	-5	-5	-1	-1	-1	1	-1	-1
18	23	3	3	5	-1	3	1	-1	1	1	5	1	1	-1	-1	-3	1	-1	-1	-3	-7	-3	-3	-3	-3	-5	-3	-1	-1	1	-1	-3
19	15	3	3	3	-5	3	-1	-5	-3	-1	1	-3	-3	-3	-1	-5	-1	-3	-1	-7	-7	-5	-3	-3	-5	-9	-3	-3	-3	-3	-5	-3
20	23	5	3	9	1	7	5	-1	3	3	5	3	3	1	3	-1	3	1	3	-3	-1	-1	1	1	-1	-1	1	1	-1	3	-1	1
21	21	7	5	9	3	3	3	-3	1	-1	3	1	1	1	3	-3	3	1	-1	-3	-5	-3	-3	-3	-3	-3	-1	-1	1	-1	-1	-1
22	27	7	7	9	1	7	5	-1	5	3	5	3	1	1	1	-1	3	1	3	-3	-3	-3	1	-1	-3	-5	-1	-3	-1	-1	-1	-3
23	21	9	7	13	3	11	5	1	7	5	7	3	5	3	5	-1	5	5	3	-1	-1	-1	1	-1	1	-1	1	-1	-1	3	-1	-1
24	29	7	7	9	3	5	5	-1	5	3	9	3	3	1	3	-1	3	3	3	-1	-3	-1	-3	-1	-3	-3	-1	-1	-3	1	-1	-1
25	21	9	11	13	5	11	7	3	5	7	11	9	7	7	7	3	7	7	7	5	3	5	7	5	1	3	7	5	5	5	3	3
26	25	3	1	7	-3	3	-1	-5	1	-1	3	-1	-1	-1	1	-3	3	1	1	-5	-5	-3	-1	-3	-1	-3	1	-1	-1	1	-1	-3
27	19	9	9	3	3	7	7	1	5	5	9	5	5	3	7	1	7	5	7	3	1	3	3	5	3	1	5	3	5	7	5	5
28	23	1	3	3	-1	1	-1	-5	-1	1	3	-1	-1	-1	-1	-5	-1	-1	-1	-5	-5	-5	-3	-3	-3	-3	-1	-1	-1	-1	-3	-1
29	15	5	5	9	1	5	3	-1	3	3	5	3	3	3	3	1	5	5	3	-1	-3	-1	-1	-1	1	-1	5	3	1	5	3	1
30	23	1	1	7	-3	3	1	-3	1	-1	3	-1	-1	-3	1	-5	-1	-1	-1	-3	-5	-3	-3	-3	-3	-5	-3	-1	-3	-1	-3	-5
31	17	7	7	7	3	5	3	1	5	5	7	5	3	1	5	1	5	5	3	-1	-1	1	1	3	1	-1	3	3	3	5	3	1
32	23	3	-1	3	-5	1	-3	-7	-3	-5	-1	-3	-3	-1	-1	-7	-1	-3	-3	-7	-7	-7	-7	-7	-9	-7	-5	-5	-5	-3	-5	-3

FIGURE 57. Walsh Transform of Figure 56.

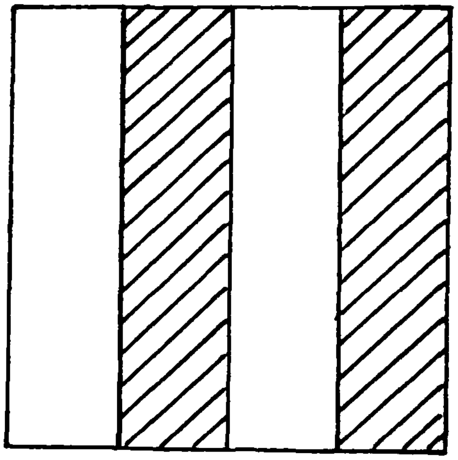

FIGURE 58. Target Representing Wal (3, x) Wal (0, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	85	15	21	113	-15	3	9	-13	-1	3	9	-7	-3	3	7	-1
2	19	7	5	15	-1	5	-1	-3	-1	5	1	3	1	5	-1	-1
3	23	7	5	13	-3	9	3	1	5	9	5	9	5	9	3	3
4	19	11	9	13	1	13	5	3	9	11	7	11	9	11	3	5
5	15	7	5	11	-1	7	1	1	3	7	1	7	3	5	-1	5
6	19	5	1	11	-5	5	-1	-3	1	1	-1	1	-1	3	-3	1
7	15	5	3	13	-5	5	-1	-1	3	5	1	5	3	5	-1	1
8	19	7	5	13	-3	11	1	-1	3	7	1	5	3	5	-1	3
9	19	7	5	11	-3	7	1	-1	3	5	1	3	1	5	-1	3
10	17	9	7	13	-1	9	1	3	5	9	3	9	5	7	1	3
11	19	5	5	13	-3	7	-1	-1	3	5	1	5	3	5	-3	3
12	17	5	5	13	-3	5	1	-1	3	3	-1	3	3	3	-3	1
13	11	3	3	7	-7	5	-3	-3	1	5	-1	3	3	5	-1	1
14	13	-3	-3	5	-11	1	-5	-9	-3	-1	-5	-3	-5	-1	-7	-3
15	9	-3	-7	5	-11	-3	-9	-11	-7	-3	-9	-7	-7	-7	-9	-9
16	13	-5	-9	3	-15	-7	-13	-13	-13	-7	-13	-9	-13	-9	-13	-13
17	11	1	-1	5	-7	-1	-5	-7	-1	-1	-5	-1	-3	-3	-9	-5
18	11	1	1	5	-7	1	-3	-5	-1	-1	-5	-1	-3	-3	-9	-5
19	13	3	1	9	-7	3	-3	-7	-3	1	-5	1	-3	-1	-7	-3
20	17	7	1	9	-3	7	-1	-3	1	5	-1	5	1	3	-3	-3
21	13	1	-3	7	-9	1	-5	-7	-3	-1	-7	-3	-5	-1	-9	-7
22	13	1	-1	7	-7	1	-7	-7	-3	1	-5	-1	-5	-3	-7	-5
23	11	-1	-3	7	-9	-1	-7	-9	-3	-1	-5	-3	-5	-1	-9	-5
24	13	-1	-3	7	-11	-1	-7	-11	-3	-3	-7	-3	-5	-3	-9	-7
25	13	5	3	9	-5	3	-3	-5	-1	1	-3	1	-1	1	-5	-3
26	15	3	-1	9	-7	1	-7	-7	-1	-3	-5	-3	-5	-1	-7	-3
27	15	9	3	11	-3	7	1	-1	5	5	-1	3	1	5	-3	-1
28	19	5	3	9	-5	5	-3	-5	1	1	-3	1	-1	1	-7	-1
29	17	5	3	9	-5	5	-1	-3	3	3	-1	1	-1	1	-5	-1
30	17	5	1	9	-7	5	-1	-3	1	3	-1	3	1	1	-5	-1
31	19	7	7	13	3	11	3	1	7	7	3	7	3	9	1	5
32	19	5	3	11	-3	5	-1	-3	3	5	-1	1	3	5	-3	1

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	3	3	7	1	-3	-5	-1	1	7	-5	-7	-1	7	7	5	11
2	-1	3	1	3	-1	-1	-5	-3	-1	-1	-7	-1	5	3	-5	1
3	5	7	3	5	1	5	-1	3	5	3	-1	7	7	9	1	9
4	7	11	7	9	5	9	5	7	11	9	1	9	9	13	5	13
5	3	7	1	5	1	3	-3	1	5	3	-3	5	7	9	1	7
6	-1	3	-3	1	-3	-1	-9	-5	-1	-3	-9	-1	3	5	-3	3
7	1	1	1	3	-1	1	-7	-1	3	1	-7	1	5	7	-3	5
8	3	5	1	5	-1	1	-3	1	3	-1	-5	1	5	7	1	7
9	1	5	-1	3	-3	1	-5	-1	1	-1	-5	3	5	5	-1	5
10	3	9	3	3	1	3	-3	-1	5	3	-5	5	7	7	-1	7
11	1	5	-1	5	1	3	-3	1	3	1	-5	1	5	5	-1	3
12	1	3	-1	3	-1	1	-5	-3	1	-1	-7	1	3	7	-1	5
13	-1	5	-1	3	-1	-1	-5	-3	1	-1	-9	1	5	5	-3	5
14	-5	-1	-5	-1	-7	-3	-7	-5	-1	-5	-11	-3	-1	-1	-7	-1
15	-7	-5	-9	-7	-9	-7	-11	-9	-7	-7	-13	-7	-3	-1	-9	-1
16	-11	-9	-13	-11	-15	-13	-17	-15	-9	-13	-17	-11	-7	-7	-11	-7
17	-5	-3	-7	-5	-9	-5	-11	-7	-3	-5	-13	-5	-3	1	-7	1
18	-5	-3	-5	-5	-7	-5	-11	-9	-5	-5	-13	-7	-5	-1	-9	-3
19	-5	-1	-5	-1	-7	-5	-11	-7	-5	-7	-13	-5	-3	-1	-9	-1
20	-3	1	-3	1	-7	-3	-9	-3	-1	-3	-9	-1	1	1	-7	1
21	-5	-3	-7	-5	-7	-7	-11	-9	-7	-7	-13	-7	-5	-1	-13	-5
22	-5	-1	-5	-5	-7	-5	-11	-7	-3	-5	-11	-7	-5	-1	-9	-1
23	-7	-3	-7	-5	-9	-7	-13	-7	-5	-7	-13	-7	-3	-3	-9	-3
24	-7	-5	-9	-5	-9	-9	-13	-9	-5	-7	-13	-7	-3	-5	-11	-3
25	-3	1	-3	1	-5	-1	-7	-5	-1	-3	-9	-3	1	1	-7	1
26	-5	-1	-7	-3	-7	-5	-11	-7	-5	-5	-13	-5	-1	1	-7	-1
27	1	3	-1	1	-3	1	-5	-1	1	1	-7	1	3	5	-3	3
28	-5	-1	-3	-3	-5	-3	-9	-7	-1	-5	-11	-5	-1	-1	-7	-1
29	-1	1	-3	-1	-3	-3	-9	-5	-5	-3	-11	-3	-1	1	-7	-1
30	-1	-1	-3	-3	-5	-5	-9	-9	-3	-5	-13	-5	-3	-1	-7	-1
31	3	5	3	3	-1	3	-3	1	1	3	-7	1	5	3	-1	5
32	1	5	1	1	-3	1	-7	-3	-1	1	-9	1	1	5	-3	1

FIGURE 59. Walsh Transform of Figure 58.

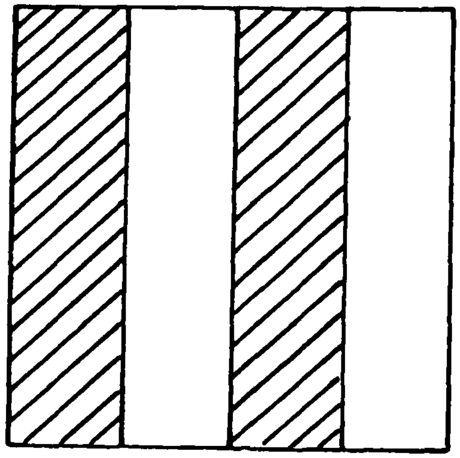

FIGURE 60. Target Representing Complement of Wal (3, x) Wal (0, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	79	-1	-11	-79	1	-1	-1	-7	-1	-7	5	5	5	-3	1	-7	5	1	1	-3	-9	-1	-3	5	-7	-9	11	5	5	-1	1	-11
2	9	-3	-3	-5	-1	-1	1	-5	-3	-5	5	-3	-1	-5	5	-7	1	-3	1	-9	-7	-5	1	-3	-7	-7	5	-1	-3	-5	-1	-7
3	7	-3	5	-1	3	1	1	1	1	-3	9	-1	1	-3	7	-3	5	1	5	-7	-3	-1	3	1	-1	-5	9	-1	1	-1	5	-3
4	9	5	7	7	5	5	7	1	5	-1	11	-1	3	1	11	1	9	3	7	-5	-3	1	5	5	1	-1	11	3	1	5	7	1
5	5	1	1	3	1	3	3	-1	1	-3	9	-1	1	-5	5	-5	3	-1	3	-9	-7	-5	3	1	-5	-5	7	-1	-3	-1	1	-3
6	9	1	3	-3	1	3	1	-5	-1	-5	5	-3	-3	-5	3	-7	3	-1	1	-9	-7	[illegible]	1	-5	-7	-9	3	-5	-5	-7	-3	-9
7	9	1	3	-1	3	1	3	-3	-1	-3	7	-1	1	-3	5	-5	1	-1	1	-9	-9	-7	-1	-3	-5	-7	5	-5	-5	-5	-1	-7
8	7	3	3	3	3	5	5	1	3	-1	9	-1	3	-3	9	-5	5	1	3	-9	-5	-3	3	-1	-5	-7	7	-1	-5	-1	-1	-5
9	9	1	3	3	3	3	5	-1	1	-1	9	3	3	-3	7	-3	5	1	3	-7	-5	-3	3	-1	-1	-7	7	-3	-5	-1	1	-5
10	11	5	7	5	7	7	7	1	5	1	13	1	5	1	11	-1	7	3	7	-3	-5	-1	7	3	-1	-1	9	1	1	1	3	-3
11	7	3	5	3	3	5	7	1	5	-1	11	1	3	-3	9	-3	5	1	5	-5	-3	-1	7	1	-3	-5	9	1	-3	-1	3	-3
12	9	5	7	3	3	5	5	-1	1	-1	9	-1	1	-3	9	-3	5	1	7	-7	-5	-3	5	-1	-1	-7	9	1	-1	-1	3	-1
13	7	3	5	7	5	7	7	1	3	1	13	1	5	1	11	-1	5	3	5	-5	-3	-1	7	1	-1	-3	11	1	-1	1	5	-3
14	11	-1	1	-3	1	1	1	-5	-1	-5	5	-3	-1	-7	3	-7	1	-3	1	-9	-7	-5	-1	-3	-9	-9	3	-3	-5	-5	-1	-7
15	7	-1	1	-3	1	1	1	-5	-3	-5	5	-5	-3	-7	3	-7	-1	-3	-1	-13	-9	-7	-1	-7	-9	-9	3	-5	-7	-5	-3	-7
16	11	-3	1	-7	-1	1	1	-5	-3	-7	3	-3	-3	-9	1	-9	-3	-5	-3	-13	-11	-7	-1	-5	-9	-13	1	-7	-9	-9	-3	-11
17	13	7	13	9	9	9	11	3	5	1	13	3	5	1	11	-1	9	3	7	-5	-1	1	5	1	-3	-5	7	1	-1	1	5	-3
18	13	7	9	9	9	9	7	3	7	3	15	3	7	1	13	-1	7	3	9	-5	-1	-1	7	3	-1	-3	9	3	1	1	3	-1
19	11	5	7	5	7	9	7	3	5	3	13	5	5	1	11	1	7	3	7	-3	-1	1	7	3	-1	-3	9	1	1	-1	5	-1
20	13	5	7	7	9	9	11	5	7	3	17	5	9	3	15	3	13	7	11	-1	1	3	9	7	1	1	15	5	5	3	11	1
21	9	3	3	-1	1	1	5	-1	3	-1	9	-1	3	-3	9	-3	5	-1	5	-7	-7	-1	7	1	-1	-3	9	1	-3	1	5	-1
22	9	1	3	-1	3	3	3	1	1	-3	7	-1	1	-3	7	-5	5	-1	3	-7	-5	-3	3	-1	-3	-5	7	-1	-1	-1	3	-3
23	7	-1	3	-3	-1	1	3	-5	-1	-5	7	-3	-1	-5	5	-7	3	-1	1	-7	-7	-5	1	-1	-5	-7	5	-1	-3	-3	-1	-5
24	7	-1	-1	-7	-3	-1	1	-5	-3	-7	5	-5	-3	-7	3	-9	-1	-5	1	-11	-9	-7	1	-3	-7	-9	3	-3	-7	-5	-1	-7
25	9	3	5	5	5	5	7	1	1	-1	9	1	3	-3	7	-3	5	1	7	-7	-3	-1	5	1	-1	-5	9	1	-3	-1	5	-3
26	9	-1	1	-3	-1	1	3	-5	-1	-5	7	-3	-1	-5	5	-5	1	-1	1	-9	-9	-7	1	-3	-5	-7	5	-3	-5	-5	1	-7
27	5	5	7	5	5	5	7	1	5	-1	11	-1	5	-3	9	-3	5	1	5	-5	-5	-1	7	1	-1	-3	9	-1	-1	3	5	-3
28	7	1	3	1	3	3	3	-1	1	-3	7	-1	1	-3	5	-3	3	-1	1	-9	-5	-3	3	-3	-5	-7	7	-3	-3	-3	1	-5
29	5	-1	3	-1	3	1	3	-3	1	-3	7	-1	-1	-5	5	-5	3	-1	1	-9	-7	-5	1	-3	-5	-5	5	-3	-5	-5	-1	-5
30	5	-1	1	-5	-1	-1	1	-5	-3	-7	5	-5	-1	-7	5	-7	1	-5	1	-9	-7	-7	-1	-3	-7	-9	3	-5	-7	-5	-3	-7
31	1	1	5	1	1	3	1	-1	-1	-3	11	-1	1	-1	7	-3	5	1	5	-7	-3	-3	5	-1	-3	-5	7	1	-1	-1	3	-3
32	5	-7	-3	-5	-3	-3	-1	-5	-3	-7	5	-5	-5	-7	1	-7	-1	-3	-1	-9	-9	-7	1	-3	-7	-7	5	-5	-7	-5	-1	-7

FIGURE 61. Walsh Transform of Figure 60.

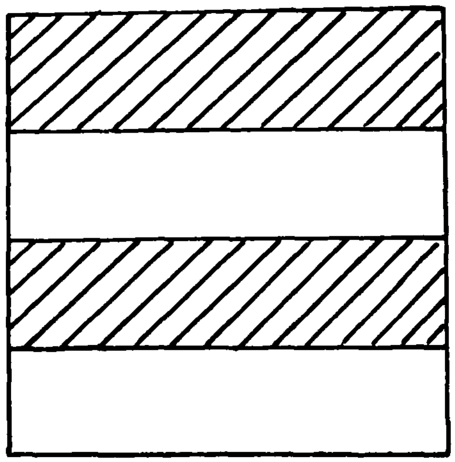

FIGURE 62. Target Representing Wal (0, x) Wal (3, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	77	9	7	3	-5	5	7	-5	1	1	9	3	-1	3	5	-1	5	5	3	-1	-5	-1	1	3	5	-5	5	5	7	3	5	3
2	19	1	1	3	-5	1	-1	-5	-1	-1	1	-1	-1	-3	-3	-7	1	-3	-3	-7	-7	-5	-3	-5	-3	-7	-5	-3	-5	-3	-5	-5
3	13	1	1	3	-5	-1	-1	-5	-1	-3	1	-1	-3	-3	-3	-7	-3	-3	-3	-7	-7	-5	-5	-5	-3	-5	-3	-5	-3	-3	-3	-5
4	121	11	11	13	-5	7	7	-3	1	3	11	3	3	3	9	-1	9	3	5	-1	-3	-1	1	1	3	-3	5	5	7	5	3	5
5	19	7	7	11	5	9	7	1	5	7	7	7	3	3	7	1	5	7	5	1	-3	1	3	3	1	-1	3	3	3	3	3	1
6	21	7	5	7	-1	7	3	-1	3	3	5	3	3	1	3	-1	3	1	1	-3	-3	-3	-3	-1	-3	-3	-1	-1	-1	1	-1	-1
7	17	5	7	7	1	5	3	-1	3	3	5	3	3	3	3	-1	3	3	1	-3	-5	-1	-1	-1	-1	-3	-1	-1	1	1	-1	-3
8	21	11	9	13	3	11	7	3	5	5	11	7	7	5	7	3	7	5	7	1	1	1	5	5	5	1	5	3	3	3	3	3
9	23	9	9	11	3	9	7	3	7	5	9	9	7	7	7	5	9	9	7	3	1	5	5	5	5	3	7	7	5	7	7	5
10	21	9	7	13	3	9	7	5	9	7	11	9	7	9	9	5	9	11	7	3	3	5	7	7	7	7	7	7	7	9	7	7
11	13	9	7	9	3	7	7	3	7	5	11	7	5	7	7	5	7	7	7	5	3	5	3	5	5	5	7	7	9	9	7	7
12	13	5	5	7	1	5	3	1	1	3	5	3	3	3	3	-1	3	3	3	-3	-1	-1	1	-1	1	-1	3	3	1	5	3	3
13	17	3	1	3	-5	1	-1	-5	-3	-1	3	-1	-1	-3	-1	-3	-1	1	-1	-5	-7	-5	-3	-5	-5	-5	-1	-1	-1	-3	-3	-1
14	15	-1	-1	3	-5	-1	-3	-5	-5	-5	-1	-3	-3	-3	-3	-5	-3	-3	-3	-7	-7	-7	-5	-7	-5	-9	-5	-5	-3	-3	-5	-5
15	11	-1	-1	1	-7	-1	-3	-7	-3	-5	-1	-3	-5	-3	-3	-9	-3	-3	-5	-7	-9	-9	-7	-5	-7	-7	-5	-5	-5	-3	-3	-5
16	17	1	1	3	-5	1	-3	-5	-5	-3	-1	-3	-3	-3	-1	-5	-3	-1	-3	-5	-7	-7	-5	-7	-5	-9	-5	-5	-5	-1	-5	-3
17	17	7	7	9	3	9	5	1	5	5	9	3	5	3	7	1	5	5	5	1	-1	3	1	3	1	1	3	3	3	3	3	3
18	17	3	5	5	-1	5	1	-1	3	1	3	1	3	1	3	-3	3	3	1	-3	-3	-1	-1	-3	-1	-5	-1	-1	-1	3	-1	-1
19	9	3	3	3	-1	3	1	-1	1	-1	1	1	1	1	3	-3	3	1	1	-3	-5	-3	-1	-1	-1	-3	-1	-1	-1	1	1	-1
20	11	3	3	7	-1	3	1	-1	1	3	5	3	3	1	3	1	3	3	3	-1	-3	-1	1	-1	-1	-3	1	1	3	3	3	3
21	13	-5	-5	-3	-11	-5	-7	-11	-9	-9	-5	-9	-9	-7	-5	-11	-7	-7	-5	-11	-11	-11	-9	-9	-9	-11	-7	-7	-9	-7	-7	-7
22	9	-5	-5	-3	-11	-5	-7	-11	-7	-9	-5	-9	-9	-9	-7	-11	-7	-7	-7	-11	-11	-9	-9	-11	-9	-11	-7	-11	-9	-5	-7	-7
23	3	-5	-5	-5	-11	-5	-9	-11	-9	-11	-7	-11	-9	-11	-7	-13	-9	-7	-9	-13	-13	-11	-11	-9	-11	-11	-9	-9	-9	-7	-9	-9
24	13	-3	-5	-3	-11	-5	-9	-11	-9	-11	-7	-9	-11	-11	-9	-11	-9	-7	-7	-11	-13	-11	-11	-11	-13	-13	-11	-11	-9	-9	-11	-11
25	15	3	1	5	-3	3	1	-5	1	-1	1	-1	-1	-3	-1	-5	-1	-1	-1	-5	-7	-3	-5	-5	-5	-7	-3	-3	-5	-3	-5	-5
26	17	1	3	5	-1	3	-1	-3	-1	-1	1	1	-3	-1	-3	-5	-1	-1	-1	-5	-7	-7	-5	-5	-5	-9	-5	-7	-5	-5	-5	-5
27	9	3	1	5	-3	3	1	-3	-1	-1	3	-1	-1	-3	1	-5	-1	-1	-1	-3	-5	-5	-5	-3	-3	-7	-5	-3	-5	-1	-5	-3
28	13	3	3	7	-1	3	1	-3	1	1	1	1	-1	-1	1	-3	1	-1	1	-5	-5	-3	-3	-3	-5	-5	-3	-5	-3	-1	-7	-5
29	15	1	1	3	-3	1	-1	-5	-1	-1	1	-3	-1	-5	-1	-5	-3	-1	-1	-5	-7	-5	-3	-5	-5	-7	-5	-3	-5	-1	-5	-5
30	13	-1	1	3	-3	1	-1	-3	-3	-3	1	-1	-1	-3	-3	-5	1	-1	-3	-5	-7	-5	-5	-5	-3	-7	-5	-5	-3	-3	-3	-3
31	9	5	3	5	-1	3	1	-3	-1	-1	3	-1	-1	-3	-1	-5	-1	-1	1	-5	-5	-5	-3	-3	-3	-5	-3	-1	-3	-1	-3	-3
32	17	1	1	3	-5	1	-3	-5	-5	-1	1	-3	-5	-3	-3	-5	-1	-3	-3	-7	-9	-5	-5	-5	-7	-7	-5	-5	-5	-3	-5	-5

FIGURE 63. Walsh Transform of Figure 62.

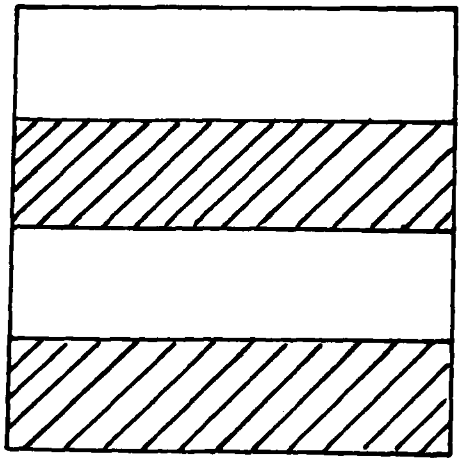

FIGURE 64. Target Representing Complement of Wal (0, x) Wal (3, y).

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	87	-3	7	3	-15	-5	-3	-13	-7	-7	-1	-5	-7	-5	-5	-9	-3	-3	-5	-9	-11	-9	-7	-5	-3	-13	-3	-3	1	-3	-3	-5
2	5	-1	-5	-1	-7	-1	-7	-9	-3	-5	-3	-5	-3	-7	-3	-9	-3	-5	-5	-9	-11	-7	-7	-7	-7	-9	-5	-7	-7	-5	-7	-7
3	15	1	7	9	5	9	5	3	7	7	9	5	5	7	7	3	7	7	7	3	1	5	5	3	5	3	5	7	5	7	5	5
4	-85	1	1	7	7	9	3	7	9	7	5	7	7	5	5	5	5	5	7	5	3	9	7	3	3	7	5	3	1	9	3	3
5	11	-5	-3	1	-5	-1	-3	-7	-3	-3	-1	-3	-3	-5	-3	-5	-3	-3	-3	-7	-7	-5	-5	-5	-5	-7	-3	-5	-3	-1	-3	-5
6	7	-3	-3	1	-5	-1	-3	-9	-3	-3	-1	-3	-3	-7	-3	-9	-3	-5	-3	-9	-9	-7	-7	-7	-5	-7	-5	-5	-5	-3	-7	-5
7	13	-1	3	5	-1	5	1	-3	1	1	3	-1	-3	-1	1	-5	-1	-1	-1	-5	-7	-3	-3	-3	-5	-5	-3	-1	-1	-3	-3	-3
8	7	3	3	5	-3	5	1	-3	3	1	3	-1	1	-1	1	-5	-1	-1	-1	-3	-5	-3	-3	-3	-5	-5	-3	-3	-5	-1	-3	-3
9	7	-1	3	3	-1	3	1	-3	3	1	1	1	-1	1	-3	-3	1	-1	-1	-3	-5	-3	-1	-5	-3	-5	-3	-5	-3	-3	-5	-7
10	9	3	3	5	-1	5	3	-3	1	-1	3	-1	1	-1	1	-5	3	1	-1	-5	-5	-3	-3	-1	-3	-7	-5	-3	-3	-1	-5	-3
11	13	-1	3	5	-3	3	1	-1	1	-1	3	1	-1	-1	-1	-5	-3	-1	1	-5	-7	-3	-3	-5	-3	-5	-1	-5	-3	-3	-3	-5
12	21	3	1	5	-1	3	-1	-5	-1	-1	3	-3	1	-3	1	-5	-1	1	-1	-5	-5	-3	-3	-5	-5	-5	-1	-1	-3	1	-3	-3
13	15	7	13	13	9	13	11	7	9	9	11	9	9	7	9	5	9	9	9	5	5	5	5	5	7	3	9	3	5	9	7	7
14	11	3	5	9	1	3	3	-1	3	1	5	1	1	-1	3	-3	3	3	1	-3	-3	-1	-1	-1	-1	-3	-1	-1	-1	3	-1	-1
15	13	1	1	5	-3	3	-1	-3	-1	-1	1	-1	-3	-1	-1	-5	-1	-1	-1	-7	-7	-5	-3	-5	-5	-7	-1	-5	-3	-3	-3	-3
16	7	-3	-5	-3	-9	-5	-7	-11	-7	-7	-7	-9	-7	-9	-7	-11	-9	-7	-7	-13	-13	-11	-11	-11	-13	-13	-11	-11	-11	-9	-11	-11
17	7	3	5	7	1	5	1	-1	1	1	1	-1	-1	-1	-1	-3	1	1	1	-5	-5	-3	-3	-5	-5	-5	-3	-3	-3	-1	-5	-3
18	11	3	7	9	1	5	5	-3	3	1	5	3	3	-1	3	-1	3	1	1	-3	-5	-3	-3	-3	-3	-3	-3	-1	-1	1	-1	-3
19	19	9	9	11	5	9	5	1	5	5	5	5	3	3	5	-1	5	3	1	-3	-3	-3	-1	-3	-1	-3	-1	-1	-1	1	-3	-1
20	25	9	9	9	3	9	7	1	5	5	9	5	5	5	5	1	7	5	3	-1	-3	1	-1	1	-1	-1	1	3	1	3	1	1
21	19	7	9	11	5	9	5	3	7	5	9	7	7	5	7	3	9	7	5	1	1	5	5	1	1	1	3	3	3	7	3	3
22	13	7	7	9	1	7	5	1	5	3	7	5	5	3	5	3	7	5	5	1	-1	3	1	3	1	1	3	3	3	7	3	3
23	13	5	5	9	-1	7	3	-1	1	3	5	1	3	1	5	1	3	3	3	-3	-3	-1	-1	-1	-1	-1	3	3	1	3	1	3
24	9	5	3	3	1	3	-1	-5	1	1	3	1	1	-1	3	-3	1	1	-1	-3	-7	-1	-3	-1	-3	-5	-1	-1	1	3	1	1
25	7	5	5	5	-1	5	1	1	3	3	7	3	3	1	5	-1	5	3	3	-1	-1	1	1	-1	-1	-1	3	3	1	7	1	1
26	9	-3	-1	-1	-7	-3	-3	-7	-3	-5	-1	-5	-5	-7	-5	-7	-5	-5	-5	-9	-11	-7	-9	-7	-7	-9	-7	-5	-5	-5	-7	-7
27	11	11	11	11	3	9	5	3	7	7	9	7	7	5	7	3	9	5	5	1	1	3	3	3	5	3	3	5	3	7	5	5
28	19	-1	1	3	-3	-1	-1	-7	-1	-1	3	-3	-1	-1	1	-5	-1	-1	-3	-7	-9	-5	-5	-5	-5	-5	-1	-1	-3	-3	-3	-5
29	13	1	3	7	-1	3	-1	-3	1	-1	5	1	1	1	1	-5	3	3	1	-5	-5	-3	-3	-3	-3	-3	-1	-1	-3	1	-1	-1
30	7	-1	-1	1	-5	-3	-3	-7	-5	-5	-1	-3	-5	-5	-3	-7	-3	-3	-5	-9	-9	-7	-7	-7	-7	-9	-5	-7	-7	-7	-7	-7
31	11	7	7	9	3	7	3	3	5	3	7	3	5	3	5	-1	[illegible]	3	3	-1	-1	1	1	3	1	-1	3	1	1	3	-1	1
32	5	-1	1	3	-3	1	-1	-3	-1	1	3	-1	-1	1	1	-3		-1	-1	-5	-5	-3	-1	-5	-3	-5	-3	-3	-3	-3	-3	-3

FIGURE 65. Walsh Transform of Figure 64.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	65	-3	43	3	29	-5	31	-9	5	-5	5	1	7	-1	7	-3	-5	-5	-5	-5	-11	-5	-9	-5	7	-5	9	1	11	1	9	1
2	1	-3	1	1	-1	1	-1	-3	-1	-3	-1	-3	-3	-5	-3	-5	-3	-3	-3	-5	-7	-5	-5	-7	-5	-5	-3	-5	-3	-3	-3	-5
3	45	1	-3	5	-11	3	-5	-1	-3	-3	1	-3	-3	-3	-1	-9	1	-1	1	-5	-5	-3	-1	-3	-3	-5	-3	-3	1	-3	-3	-1
4	5	5	7	7	3	5	3	1	3	1	5	1	5	-1	3	-1	1	1	1	-3	-1	-1	1	-3	-1	-1	1	-1	1	-1	-3	-3
5	43	5	-3	9	-11	5	-5	1	-1	-3	5	-3	-1	-1	1	-3	3	1	1	-3	-3	-1	1	-3	-3	-5	-1	-1	-1	-1	-3	-3
6	5	-1	7	3	3	3	5	1	1	-1	3	-3	3	-3	3	-3	-1	-1	-1	-3	-1	-1	-3	-3	-3	-3	-1	-3	-1	-1	-3	-3
7	43	3	-3	7	-11	5	-5	-1	-1	-3	3	-1	-1	-1	1	-5	3	1	3	-1	-1	-1	1	1	-1	-5	-1	1	-1	-1	-5	-1
8	5	3	7	7	3	5	5	1	3	1	7	1	3	-1	3	-3	1	1	1	-3	-1	-1	-1	-3	1	-1	1	1	1	1	3	-1
9	15	3	3	5	-1	7	1	1	1	1	5	-1	1	1	5	-3	1	1	3	-1	-1	-1	1	-1	1	-1	1	1	1	1	-5	-1
10	15	3	1	3	-1	5	-1	1	-1	-1	1	-3	1	-1	3	-5	-1	-1	3	-5	-1	-3	-1	-3	-1	-5	1	-1	1	-1	-3	-1
11	17	5	5	7	-1	7	3	3	3	1	5	1	1	-1	3	-3	3	1	5	-1	1	-1	1	-1	1	-3	1	1	1	-1	1	1
12	15	3	1	3	-1	5	-1	-1	-1	-1	3	-3	-1	-3	1	-5	-3	-1	-1	-5	-5	-3	-1	-3	-3	-5	-1	-3	-3	-3	-3	-3
13	19	7	3	7	1	7	3	3	3	3	7	1	3	1	5	-3	1	3	1	1	-1	1	3	-1	1	-1	3	1	3	1	3	-1
14	17	3	1	3	1	1	1	-1	1	-3	3	-3	-1	-3	1	-5	-3	-1	-3	-3	-7	-5	-5	-5	-5	-5	-1	-5	-3	-3	-3	-5
15	21	5	7	9	5	7	5	3	3	1	7	1	3	1	5	-1	3	3	3	-1	-1	-1	-1	-1	-1	-3	-1	-1	1	1	1	-1
16	15	1	3	3	1	3	1	-1	1	-3	1	-3	1	-3	1	-7	-3	-3	-1	-5	-5	-3	-3	-5	-3	-5	-3	-5	-3	-5	-5	-3
17	5	3	5	5	1	5	5	3	5	1	5	1	5	1	5	-3	3	1	3	-3	-1	1	1	-1	1	-1	1	1	1	1	1	1
18	7	1	3	7	1	3	1	1	1	-1	5	-1	3	1	5	-1	3	1	3	-3	1	1	1	-1	1	1	3	1	1	1	1	1
19	5	1	3	3	1	3	1	1	-1	-1	3	-3	3	-3	3	-3	3	1	1	-3	-1	-3	1	-3	1	-1	1	1	1	1	3	1
20	7	1	1	5	1	3	1	1	1	-1	3	-1	1	-1	3	-1	1	1	1	-1	1	1	1	-3	1	-1	3	-1	1	3	3	1
21	3	-1	3	3	-1	1	1	-1	-1	-3	1	-3	1	-3	-1	-5	-1	-1	-1	-5	-3	-5	-3	-5	-3	-5	-1	-5	-3	-3	-1	-3
22	5	-1	3	1	-1	1	1	-1	-3	-5	1	-3	-1	-3	-1	-5	-3	-3	-3	-5	-5	-3	-3	-5	-3	-5	-3	-3	-1	-5	-3	-5
23	3	-1	3	1	-1	1	1	-3	-1	-5	1	-3	-1	-5	-1	-5	-3	-3	-3	-5	-7	-5	-5	-5	-3	-5	-3	-5	-1	-3	-9	-5
24	5	-1	3	1	-1	1	1	-3	-1	-5	1	-3	-3	-5	-1	-5	-3	-3	-3	-5	-7	-5	-5	-5	-5	-5	-3	-5	-3	-3	-5	-5
25	11	5	5	7	1	5	3	3	3	1	5	-1	5	-1	5	-1	3	3	3	1	-1	1	3	1	1	1	1	1	3	3	3	1
26	11	-3	-3	1	-5	-1	-3	-3	-5	-5	-1	-7	-3	-7	-1	-9	-3	-5	-3	-5	-7	-5	-5	-7	-5	-7	-5	-5	-5	-5	-5	-5
27	13	7	5	7	1	7	3	5	3	1	7	3	5	1	5	-1	3	1	3	1	1	1	3	3	3	-1	3	3	1	3	5	1
28	9	-1	-3	-1	-5	1	-5	-3	-5	-5	-1	-5	-3	-7	-1	-7	-3	-5	-3	-7	-5	-5	-5	-5	-5	-7	-3	-5	-5	-5	-5	-5
29	11	3	1	5	1	5	1	-1	-1	-1	3	-1	1	-1	3	-3	1	1	1	-1	-1	-1	3	-1	-1	-1	3	1	1	1	1	1
30	7	-7	-3	-1	-7	-3	-5	-7	-7	-9	-5	-9	-5	-7	-3	-11	-7	-7	-3	-7	-7	-9	-5	-9	-7	-7	-5	-7	-5	-7	-9	-5
31	11	1	1	3	-3	3	1	-1	-1	-3	3	-3	1	-1	1	-3	1	1	3	-3	-1	-3	1	-1	1	-3	1	-1	1	-1	1	1
32	9	-3	-5	-3	-5	-5	-5	-7	-7	-9	-5	-9	-7	-9	-3	-11	-7	-7	-7	-11	-9	-9	-7	-9	-7	-11	-5	-9	-7	-9	-9	-9

FIGURE 66. Walsh Transform for Target Representing Road Intersection.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	[illegible]	32
1	65	1	45	1	31	-3	37	-7	7	-1	11	3	7	1	11	1	-5	-1	-5	-5	-11	-3	-9	-1	9	-3	11	3	15	1	[illegible]	1
2	5	1	5	3	1	1	3	-1	1	-3	3	-1	1	-3	1	-3	1	-1	-1	-3	-5	-1	-3	-3	-1	-5	-1	-3	-1	-3	[illegible]	-5
3	51	7	3	11	-7	9	-1	3	1	1	7	1	1	1	5	-1	5	1	5	1	-1	-1	1	1	-1	-3	1	-1	3	1	[illegible]	-1
4	9	9	11	11	9	11	9	7	7	3	9	3	7	3	7	1	5	5	7	1	1	3	3	1	1	3	3	1	3	3	3	1
5	45	7	1	13	-7	11	-1	5	1	3	7	3	5	1	7	-1	7	5	7	3	3	3	3	3	1	-1	3	1	3	3	1	1
6	7	3	7	7	5	7	7	5	5	1	7	3	5	1	7	1	3	3	3	1	1	1	1	1	1	1	3	1	3	1	3	-1
7	45	7	-1	11	-9	9	-1	3	1	1	7	1	5	1	5	-3	7	5	7	3	3	3	5	5	3	-1	3	3	3	5	3	3
8	7	3	7	5	5	7	7	5	5	1	7	3	5	1	7	1	3	3	5	1	1	3	3	3	3	1	5	5	5	5	3	5
9	17	5	5	7	-1	7	1	3	3	1	7	1	5	1	7	-1	5	3	5	1	1	3	3	5	3	1	5	5	5	3	3	5
10	15	3	1	5	-3	5	1	1	1	-1	5	1	3	-1	5	-3	3	1	3	-1	-1	-1	1	1	1	-1	3	1	1	1	1	1
11	17	7	5	9	1	5	3	1	3	1	7	1	5	1	5	-1	3	3	5	-1	1	1	3	1	3	1	3	1	5	1	3	3
12	13	3	1	3	-1	3	1	-1	-1	-1	3	-3	-1	-1	3	-5	-1	-1	-1	-3	-3	-3	-1	-3	-1	-5	-1	-3	-1	-3	3	-1
13	17	5	5	9	1	7	1	3	1	1	7	1	3	1	5	-1	5	3	5	1	1	1	3	-1	1	-1	3	1	3	3	3	3
14	13	1	1	1	-1	3	-1	-3	-1	-3	1	-3	-3	-3	-1	-5	-1	-3	-1	-5	-5	-5	-1	-5	-3	-7	-3	-3	-1	-3	[illegible]	-3
15	15	3	3	5	1	5	1	1	1	-1	3	-1	1	-1	1	-3	1	1	1	-3	-3	-1	1	-1	-1	-5	1	-3	-1	-1	3	-1
16	13	-3	1	-1	-3	-1	-1	-3	-3	-5	-1	-5	-5	-5	-3	-7	-5	-5	-5	-7	-7	-7	-5	-9	-5	-7	-3	-5	-3	-7	[illegible]	-7
17	3	-1	1	1	1	1	1	-1	-1	-1	3	-3	1	-1	1	-5	-1	1	-1	-3	-3	-1	-1	-3	-3	-5	1	-3	-1	-3	[illegible]	-3
18	3	-3	-1	-1	-3	-1	-1	-3	-1	-3	1	-3	1	-3	1	-5	-1	1	-1	-3	-3	-3	-1	-3	-3	-3	1	-3	-1	-3	[illegible]	-3
19	1	-3	-1	1	-1	-1	-1	-3	-3	-5	1	-5	-1	-3	-1	-7	-3	-3	-3	-5	-5	-5	-3	-5	-3	-5	-1	-3	-1	-3	[illegible]	-5
20	3	-1	-1	1	-5	-1	-3	-3	-3	-5	-1	-3	-1	-3	-1	-7	-3	-3	-3	-5	-5	-3	-3	-5	-3	-3	-1	-3	-1	-1	[illegible]	-3
21	1	-3	-1	-3	-3	-1	-3	-5	-5	-9	-1	-7	-5	-7	-3	-9	-5	-5	-5	-9	-9	-5	-7	-7	-5	-7	-3	-7	-5	-5	[illegible]	-5
22	3	-3	-1	-1	-3	1	-3	-5	-3	-5	-1	-7	-3	-7	-3	-7	-5	-5	-5	-7	-9	-7	-7	-7	-7	-7	-5	-7	-5	-5	[illegible]	-7
23	1	-1	1	-1	-1	-1	-1	-5	-3	-5	-1	-5	-3	-5	-1	-7	-5	-5	-5	-9	-9	-7	-7	-9	-7	-9	-5	-9	-7	-5	[illegible]	-7
24	3	-1	-1	1	-1	-1	1	-5	-1	-5	-1	-5	-3	-5	-1	-7	-5	-5	-5	-7	-7	-7	-5	-9	-7	-7	-7	-7	-5	-5	[illegible]	-7
25	13	5	3	7	-1	5	3	3	3	-1	5	1	3	-1	3	-3	1	3	3	-1	1	1	1	-1	-1	-1	-1	-1	-1	1	3	-1
26	9	-3	-3	-1	-5	-3	-3	-5	-3	-5	-1	-5	-3	-9	-3	-9	-5	-5	-5	-7	-7	-7	-5	-7	-7	-7	-5	-7	-7	-7	[illegible]	-7
27	13	5	5	7	1	7	3	3	5	1	7	1	3	1	5	-1	3	1	3	-1	1	1	3	1	-1	1	1	1	1	1	1	-1
28	11	-1	-3	3	-5	1	-5	-5	-3	-5	-1	-5	-3	-5	-1	-9	-5	-3	-3	-9	-5	-5	-5	-7	-7	-7	-5	-5	-5	-5	[illegible]	-5
29	15	3	3	7	1	5	1	1	1	-1	5	-1	3	-1	3	-3	3	1	3	-3	1	1	-1	-1	-1	1	1	1	1	3	3	1
30	11	-1	-1	1	-5	-1	-5	-3	-5	-5	-3	-7	-3	-7	-1	-9	-5	-5	-3	-9	-7	-7	-5	-7	-7	-7	-5	-5	-5	-5	[illegible]	-7
31	15	7	7	9	1	5	3	3	3	1	7	1	5	1	5	-1	5	3	3	-1	1	1	3	1	1	-1	3	1	3	3	3	1
32	13	-1	-1	1	-3	1	-1	-1	-3	-5	-1	-5	-3	-5	-1	-9	-3	-3	-3	-9	-5	-5	-5	-9	-5	-7	-5	-5	-5	-3	[illegible]	-7

FIGURE 67. First Repetition of Walsh Transform for the Same Target Used to Produce Figure 66.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	66	-2	46	4	30	-4	34	-8	6	-2	8	2	8	0	8	-2	-8	-4	-8	-6	-12	-6	-8	-2	6	-6	8	-2	10	-4	8	-2
2	2	-2	0	2	0	0	0	-2	0	-2	2	-4	0	-6	2	-6	-2	-2	-2	-4	-6	-4	-4	-6	-6	-6	-2	-6	-6	-6	-4	-6
3	48	4	-2	8	-10	6	-6	0	-2	-2	2	-2	0	-2	4	-6	2	2	4	-4	-2	-4	0	-2	-2	-4	0	0	0	-2	-2	-2
4	8	6	10	10	8	8	8	8	6	4	8	6	8	2	6	2	6	6	6	4	4	4	6	4	6	4	6	4	6	4	6	2
5	46	10	0	12	-8	12	-2	6	4	2	8	0	4	2	6	0	8	6	8	2	4	2	4	4	2	0	2	2	4	6	2	4
6	6	2	6	4	2	2	2	0	0	0	4	-2	0	-2	4	-4	0	-2	0	-4	-2	-2	-2	-4	-2	-2	0	0	0	0	0	-2
7	46	4	-2	6	-8	4	-4	0	0	-2	4	-2	0	-2	2	-4	2	2	2	-2	-2	-2	0	0	-2	-4	0	-2	0	0	0	0
8	6	2	4	6	4	4	6	2	4	0	4	0	4	0	4	-2	0	0	0	-2	0	0	-2	-2	-2	0	0	0	0	0	2	0
9	20	6	6	8	0	6	2	2	4	2	6	0	4	0	6	-2	2	2	2	-2	2	0	2	-2	0	0	2	0	2	2	2	0
10	18	4	4	6	0	6	2	2	0	0	4	0	2	0	0	-2	2	2	-2	-2	-2	-2	2	-4	-2	-4	0	-2	0	-2	0	-2
11	18	8	8	10	2	8	6	4	4	2	8	0	4	0	6	-2	6	2	4	0	0	2	0	0	0	0	2	2	2	2	2	0
12	20	6	4	6	0	6	2	2	2	0	4	-2	2	0	4	-2	2	0	2	-2	0	-2	0	-2	-2	-4	0	-2	0	-2	-2	-4
13	20	6	6	10	0	8	6	4	6	4	8	4	6	4	8	0	6	6	6	4	2	4	6	2	4	0	4	2	4	2	4	2
14	14	2	2	4	0	4	2	0	0	-2	4	0	0	-2	4	-4	0	2	0	-2	-2	0	0	-2	-2	-2	0	-2	-2	-4	-2	-2
15	18	2	6	8	0	4	2	0	2	0	4	0	2	0	4	-2	4	2	4	0	2	0	2	0	2	0	4	2	4	4	4	2
16	14	-2	0	0	-2	-2	0	-4	-4	-6	2	-2	0	-4	0	-6	-4	-2	-2	-6	-6	-4	-4	-4	-4	-4	-2	-4	-2	-4	-2	-4
17	2	0	0	2	0	4	4	-2	2	-4	2	-2	0	-4	2	-4	0	0	0	-4	-2	-2	-2	-2	-2	-2	0	0	2	0	0	0
18	4	2	2	4	0	4	0	-2	0	-2	2	-2	0	-2	2	-4	0	0	2	-4	-4	-4	-2	-2	-2	-4	0	-2	0	-2	0	0
19	4	0	2	2	2	0	0	-2	0	-2	2	-2	0	-2	0	-6	-2	-2	-4	-4	-4	-4	-2	-4	-4	-4	0	-4	-2	-4	-2	-4
20	4	0	2	4	0	2	2	0	2	-2	2	-2	2	-2	2	-4	0	0	0	-4	-2	-2	0	-2	-2	-2	-2	-4	0	0	0	-2
21	2	0	2	2	0	0	0	-2	-2	-4	0	-4	0	-4	0	-6	-4	-4	-4	-8	-6	-6	-6	-6	-4	-6	-2	-4	-4	-4	-4	-4
22	4	-2	0	2	0	0	-2	-4	-2	-4	0	-4	0	-6	0	-6	-4	-2	-4	-4	-6	-4	-4	-4	-4	-6	-2	-4	-2	-4	-2	-4
23	0	0	2	2	0	0	0	-4	-2	-4	0	-4	0	-6	0	-6	-4	-4	-2	-6	-6	-6	-4	-6	-6	-6	-4	-4	-4	-4	-4	-6
24	4	-2	0	0	-2	0	0	-4	-2	-4	2	-4	-2	-4	-2	-6	-4	-4	-4	-6	-6	-6	-4	-6	-6	-6	-4	-4	-4	-4	-4	-6
25	12	2	2	4	0	2	2	0	2	0	6	0	2	0	2	-2	2	2	2	0	0	0	2	0	2	0	2	0	2	2	2	0
26	6	-6	-6	-4	-6	-4	-6	-6	-6	-8	-4	-8	-6	-10	-4	-10	-6	-6	-6	-8	-8	-6	-6	-8	-8	-8	-4	-8	-6	-6	-4	-6
27	8	2	0	4	-2	2	-2	0	-2	-2	2	-2	2	-2	2	-4	0	0	0	-4	0	-4	0	-2	-2	-2	2	0	2	2	2	0
28	8	-4	-4	-4	-6	-4	-6	-6	-6	-8	-4	-8	-6	-10	-6	-10	-8	-6	-6	-8	-8	-8	-6	-8	-8	-10	-6	-8	-6	-8	-6	-8
29	12	2	2	4	-2	0	0	0	-2	-4	4	-4	0	-6	0	-6	-2	-2	-2	-4	-4	-4	-4	-4	-4	-4	-4	-2	-2	-2	0	-2
30	8	-4	-2	-2	-6	-4	-6	-6	-6	-8	-6	-8	-6	-8	-4	-10	-6	-8	-8	-12	-10	-12	-8	-12	-10	-12	-8	-10	-8	-8	-10	-10
31	12	4	4	4	0	2	0	0	2	0	4	0	0	-2	2	-4	0	0	0	-4	-2	-2	0	-2	-2	-2	-2	-4	-2	-2	-2	-4
32	10	-2	-2	0	-4	-2	-4	-6	-4	-8	-2	-8	-4	-8	-2	-10	-6	-6	-6	-10	-8	-8	-8	-8	-8	-8	-6	-8	-6	-8	-6	-8

FIGURE 68. Second Repetition of Walsh Transform for the Same Target Used to Produce Figure 66.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	65	-3	51	5	31	-3	37	-7	7	-1	9	3	9	1	9	-1	-3	-1	-5	-5	-11	-3	-9	-1	9	-3	9	1	13	1	11	1
2	1	-1	3	3	1	1	3	-1	3	-1	3	-3	1	-3	1	-3	-1	-1	-1	-3	-5	-1	-3	-3	-3	-5	-1	-3	-1	-3	1	-5
3	49	5	1	9	-9	7	-5	1	-1	1	5	-1	1	-1	5	-5	3	1	3	-3	-1	-1	1	-1	-1	-3	-1	1	3	1	1	1
4	9	7	9	11	7	9	7	7	5	3	7	3	5	3	7	1	5	3	5	1	1	1	3	1	3	1	3	1	5	3	3	1
5	49	7	-1	11	-7	9	-3	3	1	1	7	1	1	1	5	-3	5	5	3	-1	-1	1	1	1	-1	-3	1	1	1	-1	-1	-1
6	9	5	9	7	7	7	7	5	7	1	5	1	5	1	7	1	3	3	3	-1	-1	1	1	-1	-1	1	1	-1	1	1	1	-1
7	47	7	1	13	-7	9	-3	3	1	1	7	3	5	3	7	-1	7	5	7	1	3	1	5	1	1	-1	1	1	3	3	1	1
8	9	3	9	7	7	7	7	7	5	3	7	5	7	3	7	1	5	5	5	1	3	3	5	1	3	1	7	1	5	5	5	3
9	19	5	7	9	1	7	5	3	5	1	7	3	7	3	7	3	5	5	5	1	3	5	5	3	5	1	7	5	7	3	5	3
10	15	5	3	7	-1	5	1	1	3	1	7	1	3	1	5	-3	3	3	3	1	1	1	3	1	1	1	1	1	3	3	1	1
11	17	5	5	9	1	7	3	3	3	1	7	1	5	1	7	1	5	3	3	-1	1	1	5	3	3	1	5	3	5	5	5	3
12	15	1	3	3	-3	3	1	1	-1	-1	3	-3	1	-1	3	-5	-1	1	-1	-3	-1	-3	1	-3	-1	-3	1	-3	1	-1	-1	-1
13	17	5	5	9	1	7	3	3	3	1	7	1	3	3	7	-1	5	5	5	1	1	1	3	1	1	1	5	3	5	3	3	1
14	13	1	1	3	-3	1	-1	-1	-3	-5	1	-5	1	-3	1	-5	-1	-3	1	-3	-3	-3	-3	-3	-3	-5	-1	-3	-3	-1	-1	-3
15	17	1	5	7	1	5	1	1	1	1	3	-1	3	-1	3	-3	1	1	1	-3	-1	-1	-1	-1	1	-3	1	-1	1	1	1	-1
16	13	-1	1	1	-3	-1	-1	-3	-1	-5	-1	-5	-1	-5	-3	-5	-5	-5	-5	-7	-7	-5	-5	-5	-5	-7	-5	-7	-3	-5	-3	-7
17	3	1	3	3	1	3	1	1	1	-1	3	-1	1	-1	3	-3	-1	-1	1	-3	-3	-3	-1	-3	-3	-3	-1	-1	1	-1	1	-3
18	5	1	1	3	-1	1	3	-1	1	-3	3	-3	3	-3	1	-3	-1	-1	1	-3	-3	-3	-1	-1	-1	-3	-1	-1	1	-1	-1	-1
19	1	-1	1	1	-1	3	1	-3	-3	-3	1	-3	-1	-5	1	-5	1	-3	-1	-5	-3	-3	-1	-5	-3	-5	-1	-3	-1	-1	-3	-1
20	3	-1	-1	1	-3	-1	-1	-3	-1	-3	3	-3	1	-3	1	-3	-1	-1	-1	-5	-3	-1	-1	-3	-1	-3	1	-3	-1	-1	1	-3
21	-1	-3	-1	-3	-3	-3	-3	-5	-3	-7	-1	-7	-3	-7	-3	-7	-5	-5	-5	-7	-7	-5	-5	-7	-5	-5	-5	-5	-3	-3	-3	-3
22	3	-3	-3	-1	-5	-1	-5	-5	-5	-7	-1	-7	-3	-7	-3	-9	-5	-5	-3	-9	-7	-7	-5	-5	-5	-7	-5	-5	-3	-3	-3	-5
23	1	-5	1	-1	-3	-1	-3	-3	-3	-5	-3	-7	-3	-5	-5	-7	-5	-5	-7	-9	-7	-7	-5	-9	-5	-9	-5	-7	-7	-5	-5	-7
24	5	-1	1	1	-1	-3	-1	-5	-3	-5	-1	-3	-3	-7	-3	-7	-5	-7	-7	-9	-7	-7	-7	-9	-7	-9	-5	-7	-7	-7	-5	-7
25	13	5	5	7	1	5	3	3	1	-1	5	-1	3	-1	5	-3	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	1	-1	-1	-3
26	11	-1	-1	-1	-5	-1	-3	-3	-5	-5	-1	-5	-3	-7	-1	-7	-5	-5	-5	-7	-7	-9	-7	-7	-9	-9	-5	-7	-5	-7	-7	-9
27	13	5	5	7	1	7	3	5	3	1	7	1	3	1	5	-1	3	3	5	1	1	1	3	1	1	-1	1	-1	1	1	1	1
28	13	-1	-1	1	-5	1	-3	-5	-3	-5	1	-7	-1	-5	-1	-7	-3	-3	-3	-7	-7	-5	-5	-7	-5	-7	-5	-5	-5	-5	-5	-7
29	13	3	3	7	1	7	3	1	3	1	5	-1	3	1	3	-3	3	1	3	-1	-1	1	1	-3	-1	-1	1	-1	-1	1	-1	1
30	9	-1	-1	1	-5	1	-3	-5	-5	-7	-1	-5	-3	-5	-1	-7	-3	-5	-5	-9	-5	-7	-5	-9	-5	-7	-5	-7	-5	-5	-5	-5
31	13	5	7	7	1	7	3	3	3	1	7	1	3	1	5	-1	3	3	5	-1	1	1	3	-1	3	-1	1	1	3	3	3	1
32	11	-3	-1	1	-5	-1	-1	-5	-3	-5	-1	-7	-3	-7	-1	-7	-5	-5	-3	-5	-7	-5	-5	-7	-7	-7	-3	-5	-3	-5	-3	-5

FIGURE 69. **Third Repetition of Walsh Transform for the Same Target Used to Produce Figure 66.**

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	50	2	58	6	44	0	46	0	2	-12	2	-8	6	-6	8	-6	-4	0	-6	2	-8	0	-8	2	8	-4	8	-4	14	-4	14	-2
2	6	0	4	2	2	0	0	0	2	-6	0	-4	0	-4	2	-4	-2	0	0	-2	-4	-4	-4	-2	0	-2	0	-2	0	-2	2	0
3	8	2	8	4	6	2	6	4	4	-2	4	0	4	-2	4	0	0	0	0	0	0	-2	0	0	4	0	4	0	4	0	4	0
4	4	4	4	4	4	8	2	6	6	2	6	0	4	4	6	0	2	2	4	2	4	0	4	0	4	2	4	2	4	4	4	4
5	4	2	0	4	0	4	-2	2	2	0	2	0	4	0	4	-2	2	0	0	-2	0	-2	0	-2	2	0	2	0	2	2	0	0
6	8	2	4	2	2	2	4	2	2	-4	4	-2	4	-4	2	-4	0	-2	0	-2	-2	-2	-2	-2	0	-2	0	-2	0	0	0	-2
7	8	2	4	2	4	4	2	2	4	-2	4	-4	4	-2	4	-2	0	0	0	-2	0	0	-2	-2	2	0	2	0	2	0	4	0
8	2	2	2	2	0	2	2	4	2	0	4	0	2	0	2	-2	0	0	0	0	0	0	0	-2	2	0	2	0	2	0	2	0
9	4	0	0	2	0	4	0	2	2	0	4	-2	0	0	4	-4	0	0	0	0	0	-2	0	-2	0	0	2	0	0	0	2	0
10	8	4	4	4	4	4	2	4	2	0	4	0	6	0	4	-2	2	0	2	-2	0	0	0	0	4	2	4	0	2	2	2	0
11	4	0	4	2	2	2	2	2	2	-2	2	-4	2	-2	4	-4	0	-2	0	-2	0	-2	0	0	2	0	2	0	2	2	2	0
12	2	0	-2	0	-2	0	-2	0	0	-4	0	-4	0	-2	2	-4	0	-2	0	-4	-2	-2	-2	-2	0	-2	2	-2	0	0	0	-2
13	0	0	-2	0	0	0	-4	2	0	-4	2	-2	2	-4	0	-4	-2	-2	-2	-2	-2	-2	0	-4	2	0	0	-2	2	-2	0	0
14	6	0	2	0	0	2	0	0	-2	-6	0	-6	-2	-6	0	-6	-4	-4	-2	-6	-6	-4	-4	-6	-4	-4	-2	-4	-2	-4	-2	-4
15	4	0	2	0	0	0	0	-2	0	-6	0	-6	0	-6	0	-6	-4	-6	-4	-6	-6	-6	-4	-6	-2	-6	-2	-6	-4	-4	-4	-4
16	2	-2	0	0	-2	-2	0	-2	-4	-8	-2	-8	-4	-8	-2	-8	-6	-8	-6	-6	-6	-8	-6	-10	-6	-6	-6	-6	-6	-6	-4	-8
17	4	2	0	2	0	2	0	0	2	0	2	-2	2	-2	2	-4	0	0	-2	-4	-2	-2	-2	-4	0	-2	0	-2	0	-2	0	-2
18	6	0	2	2	2	2	2	2	0	-4	4	-2	2	-2	2	-4	0	-2	0	-2	0	-4	0	-4	0	-2	0	-4	0	-2	0	-4
19	4	2	2	2	2	4	0	2	0	-2	2	-2	2	-2	2	-4	-2	-2	-2	-4	-2	-4	-2	-4	0	-2	0	-2	0	-2	0	-2
20	4	2	0	4	-2	4	0	2	2	-2	2	-2	2	-2	2	-2	0	-2	0	-2	0	0	0	-2	0	0	0	0	0	0	0	0
21	2	0	0	2	0	0	0	0	0	-6	0	-4	0	-6	0	-4	-2	-4	-2	-4	-4	-4	-4	-4	-2	-4	-2	-4	-2	-4	-2	-4
22	4	0	2	2	0	0	0	0	-2	-4	0	-4	0	-4	0	-6	-4	-2	-4	-6	-4	-4	-4	-4	-2	-4	0	-6	-2	-4	0	-4
23	4	0	2	2	2	2	0	0	0	-4	0	-4	0	-6	0	-6	-2	-4	-2	-4	-4	-4	-4	-6	0	-2	0	-4	-2	-4	0	-4
24	4	0	2	0	0	2	0	0	-2	-6	0	-4	0	-6	0	-6	-4	-4	-2	-6	-4	-6	-4	-6	-2	-4	-2	-4	-2	-4	0	-4
25	6	4	2	4	0	4	0	4	4	0	4	-2	4	-2	4	-4	0	0	2	-2	0	0	0	-2	0	0	0	-2	0	0	0	0
26	8	2	6	4	2	4	2	2	2	-4	2	-4	2	-2	2	-4	0	-4	-2	-2	-4	-2	-4	-4	-2	-2	-2	-4	0	-2	-2	-4
27	10	6	6	6	4	6	4	4	6	2	6	0	6	2	6	0	2	0	2	0	0	0	2	0	2	0	4	0	0	0	4	0
28	6	2	4	4	2	4	4	4	4	0	4	0	4	0	6	0	2	0	0	-2	2	0	0	-2	0	0	2	-2	0	0	0	0
29	4	2	2	4	0	4	0	2	2	0	4	0	4	0	4	-2	0	0	2	-2	0	0	0	0	2	2	2	0	2	0	2	0
30	6	0	2	2	2	2	2	0	2	-4	2	-2	2	-4	2	-6	0	-2	0	-2	-2	0	-2	-2	0	0	0	-2	0	0	2	-2
31	4	2	4	4	2	2	4	4	4	-2	4	-2	4	0	6	-2	2	0	2	0	0	0	0	0	2	2	4	0	4	2	4	2
32	4	0	0	2	0	2	0	0	2	-2	2	-4	0	-4	2	-6	-2	-2	0	-4	-2	0	0	-4	0	-2	0	-2	0	-2	0	-2

FIGURE 70. Walsh Transform for Target Representing Vertical Line Road.

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	49	1	47	3	41	-1	43	-1	1	-13	-1	-9	7	-7	5	-7	-5	1	-7	1	-9	-1	-9	1	7	-5	7	-5	13	-5	11	-3
2	3	-3	1	1	-1	1	-1	-1	-1	-5	1	-3	-1	-5	1	-5	-1	-3	-3	-3	-3	-5	-3	-5	1	-5	-1	-3	-1	-3	1	-1
3	5	-1	3	3	3	1	3	1	3	-5	1	-3	3	-3	3	-3	1	-1	-1	-1	-1	-1	-1	-1	1	-1	1	1	3	-1	3	1
4	3	3	1	3	-1	3	1	3	3	-3	3	-1	3	1	5	-1	1	1	1	-1	1	1	1	-1	3	1	5	1	5	3	3	1
5	1	-1	-1	1	-3	1	-3	1	-1	-3	1	-3	1	-3	1	-3	-1	-1	-1	-3	-3	-3	-1	-3	1	-3	1	-1	1	-1	1	-1
6	7	1	1	1	1	1	1	1	-1	-3	-1	-5	1	-5	1	-5	-3	-5	-3	-5	-3	-5	-5	-5	-3	-5	-1	-5	-1	-3	-3	-3
7	7	1	5	3	3	1	3	1	1	-3	1	-3	1	-3	1	-3	-1	-1	-1	-3	-1	-3	-3	-3	-1	-1	-1	-3	1	-1	1	-3
8	5	1	3	3	1	3	-1	3	3	-1	3	-3	3	-1	3	-3	-1	-1	-1	-3	-1	-1	-1	-3	-1	-1	-1	-3	1	-3	-1	-3
9	3	1	1	3	1	3	-1	3	1	-1	3	-1	3	-1	3	-3	1	-1	1	-3	-1	-3	-1	-3	-1	1	1	-3	-1	-1	1	-3
10	7	3	5	5	3	5	5	3	3	-1	5	-1	5	-1	5	-1	3	1	1	1	1	-1	1	1	3	1	1	1	3	3	3	-1
11	9	3	5	3	3	3	5	1	3	-1	3	-1	3	1	3	-3	1	-1	-1	-1	-1	1	-1	-3	1	1	3	-1	1	-1	3	-1
12	3	1	1	5	1	3	1	1	1	-1	3	-1	1	-1	3	-3	1	-1	-1	-3	-1	-1	1	-3	1	-1	1	-1	1	1	1	-1
13	3	3	1	3	-1	5	-1	3	1	1	5	-1	3	-1	5	-3	1	1	1	-1	-1	-1	1	-1	1	-1	1	1	1	1	1	1
14	9	1	5	3	3	1	3	1	1	-3	1	-3	1	-3	1	-5	-3	-3	-1	-3	-3	-3	-3	-3	-1	-1	1	-3	1	-1	1	-3
15	7	1	5	3	3	1	3	1	1	-5	1	-5	1	-3	1	-5	-1	-3	-3	-5	-3	-3	-3	-5	1	-3	-1	-5	-1	-3	-1	-5
16	3	1	1	1	-1	1	-1	-1	-3	-5	1	-5	-1	-5	-1	-5	-5	-5	-5	-7	-5	-5	-5	-5	-3	-5	-3	-5	-3	-5	-5	-5
17	7	5	5	5	5	5	3	3	5	1	5	-1	5	-1	3	-3	1	1	1	-1	-1	1	-1	-3	1	1	3	-1	1	1	3	1
18	11	5	7	5	5	5	5	7	5	1	5	-1	5	1	5	-1	1	1	1	1	1	1	1	-1	1	1	3	-1	3	-1	1	-1
19	9	5	5	5	5	5	5	5	3	1	5	1	5	-1	5	-3	1	1	1	-1	-1	-1	1	-1	1	1	1	-1	1	1	1	1
20	5	5	3	7	3	7	3	5	5	1	7	1	5	1	7	-1	3	1	3	1	1	3	3	1	3	3	3	1	3	1	5	1
21	5	1	3	3	1	3	1	1	3	-1	3	-3	3	-1	3	-1	1	1	-1	-1	-1	-1	1	-1	3	1	1	-1	3	-1	1	-1
22	7	1	3	1	1	3	3	1	1	-3	1	-1	1	-3	3	-5	1	-1	1	-3	-1	-1	-1	-1	1	-1	1	-1	3	1	3	-1
23	5	-1	3	1	3	1	1	1	1	-5	1	-3	1	-3	1	-3	1	-3	-1	-3	-3	-1	-1	-3	1	1	1	-1	1	1	1	-1
24	5	1	1	1	1	1	-1	1	1	-5	1	-5	-1	-3	1	-5	-1	-3	-3	-3	-3	-5	-5	-3	-3	-3	1	-3	1	-1	-1	-3
25	5	3	3	3	1	5	3	3	1	1	5	-1	3	1	5	-1	1	-1	1	-1	1	-1	1	-1	1	1	3	-1	1	1	3	1
26	7	1	3	3	1	1	1	1	1	-3	3	-3	1	-3	1	-3	-1	-3	-3	-5	-3	-3	-3	-3	-1	-1	-1	-3	1	-1	1	-3
27	5	3	5	5	3	5	3	5	3	-1	3	-3	5	-1	3	-1	1	1	1	1	-1	1	1	-1	1	1	1	-1	1	1	3	1
28	5	1	3	1	1	3	1	1	3	-1	3	-3	3	-1	1	-3	-1	-1	-1	-3	-1	-1	-1	-3	1	-1	1	-3	-1	-1	1	-1
29	3	1	1	3	1	3	-1	1	1	-3	1	-1	3	-3	3	-3	1	-3	1	-3	-1	-3	-1	-3	1	-1	1	-1	1	1	1	-1
30	5	1	1	1	1	1	1	1	1	-5	3	-3	1	-3	1	-5	-1	-3	-1	-3	-3	-3	-3	-3	-1	-1	-1	-3	-1	-3	-1	-3
31	5	1	3	3	1	3	3	1	3	-3	5	-1	3	1	5	-3	1	1	1	-1	-1	-1	-1	-1	1	1	3	-1	1	1	3	1
32	3	-1	-1	1	1	1	-1	1	-1	-3	-1	-3	1	-3	1	-5	-1	-3	-3	-5	-1	-1	-3	-5	-1	-3	-1	-3	1	1	1	-3

FIGURE 71. **First Repetition of Walsh Transform for the Same Target Used to Produce Figure 70.**

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	49	1	59	5	45	-1	43	1	1	-13	-1	-7	5	-7	7	-5	-5	-1	-7	1	-9	-1	-9	-1	7	-5	7	-5	13	-3	13	-3
2	7	-3	3	1	1	1	1	1	-1	-3	1	-3	1	-3	1	-3	-3	-3	-1	-3	-3	-3	-1	-3	-1	-3	1	-5	1	-5	1	-3
3	9	3	7	7	5	3	5	3	3	-3	3	-1	5	-1	5	-1	3	1	1	-3	1	-1	-1	-1	1	1	3	1	3	1	3	1
4	5	5	3	7	3	7	3	5	5	3	7	1	7	1	7	-1	3	3	5	-1	3	3	3	3	5	3	5	3	5	5	3	3
5	3	1	-1	5	-1	3	1	3	3	-1	3	-1	3	-1	3	-3	1	-1	-1	1	1	1	1	-1	1	1	1	1	1	1	1	1
6	7	1	5	3	3	1	3	1	1	-3	3	-3	3	-3	3	-3	1	-1	-1	-1	-1	-1	-3	-3	1	-1	1	-1	3	-1	1	-3
7	7	1	5	3	5	3	5	3	3	-1	3	-1	5	-1	3	-1	1	1	1	1	-1	-1	-1	-1	3	-1	3	-1	3	1	5	-1
8	3	1	1	3	-1	3	1	3	1	-1	3	-1	3	1	3	-1	1	1	1	-1	1	-1	1	-1	1	1	1	-1	3	1	3	1
9	1	-1	-1	1	-1	1	-1	1	1	-1	1	-3	1	-3	3	-3	1	-1	1	-3	-1	-1	1	-1	1	-1	1	-1	1	1	1	1
10	7	1	3	3	1	3	1	3	1	-1	1	-1	3	-1	3	-3	1	1	1	-1	-1	1	1	-1	3	1	1	-1	1	3	3	-1
11	5	1	3	1	3	3	1	1	1	-3	1	-3	1	-3	3	-5	-1	-3	-1	-3	-3	-3	-3	-3	1	-1	1	-1	1	-1	1	-1
12	1	1	-1	1	-1	1	-1	-1	1	-3	1	-5	1	-5	1	-5	-3	-3	-3	-5	-3	-3	-3	-5	-3	-3	-1	-3	-1	-3	1	-3
13	1	1	1	3	-1	1	-1	1	3	-1	3	-1	1	-3	1	-3	-1	-3	-3	-3	-1	-1	-3	-3	1	-1	-1	-3	1	-3	-1	-3
14	7	-1	5	1	3	1	3	1	-1	-5	1	-5	-1	-3	1	-5	-3	-3	-3	-5	-5	-3	-3	-5	-1	-5	-1	-5	-3	-5	-1	-5
15	7	-1	5	3	3	-1	3	1	-1	-5	1	-3	1	-5	1	-5	-3	-3	-3	-3	-3	-5	-5	-5	-1	-5	-1	-3	-1	-3	-1	-3
16	3	-1	1	1	-1	1	-3	-1	-3	-5	-1	-5	-1	-7	-1	-7	-5	-5	-5	-7	-5	-7	-5	-7	-3	-5	-3	-5	-3	-5	-5	-5
17	3	3	1	3	1	3	1	3	3	-1	3	-3	3	-1	3	-3	1	-3	1	-1	-1	1	1	-1	1	1	3	-1	1	1	1	-1
18	5	1	5	3	3	3	1	1	3	-1	3	-1	3	-1	3	-3	1	-1	1	-1	-1	-1	-1	-3	1	-1	1	-1	1	1	1	-1
19	5	1	3	1	3	1	3	1	1	-3	5	-3	1	-1	3	-3	-3	-1	-1	-5	-3	-1	-1	-5	1	-1	1	-1	1	-1	1	-1
20	3	1	1	5	1	5	1	5	3	-1	5	-1	3	1	3	-1	1	1	1	-1	1	-1	-1	-1	3	1	1	-3	1	-1	1	-1
21	5	1	1	3	-1	3	1	1	1	-3	1	-3	-1	-3	1	-5	-1	-3	-1	-5	-3	-5	-3	-5	-1	-3	-1	-3	-1	-3	1	-3
22	5	1	3	3	1	3	1	1	1	-3	1	-5	1	-3	1	5	-1	-3	-3	-5	-3	-3	-3	-5	1	-3	1	-3	-1	-1	-1	-3
23	7	3	5	3	3	3	3	1	1	-3	1	-5	1	-3	3	-5	-3	-3	-1	-3	-3	-3	-3	-3	-1	-3	-1	-3	-1	-3	-1	-3
24	7	3	3	3	3	3	1	1	3	-3	1	-5	1	-3	1	-3	-1	-1	-3	-5	-3	-3	-5	-5	-3	-3	-3	-3	-1	-3	-1	-5
25	7	5	5	7	3	5	5	5	5	1	7	1	5	3	7	-1	3	1	1	1	1	1	1	-1	5	1	3	1	3	1	1	-1
26	9	1	5	3	5	5	5	5	3	1	3	-1	3	-1	1	-3	1	-1	1	-1	-1	-1	-1	-3	1	-1	1	-1	1	-1	3	-3
27	7	5	7	9	5	7	5	5	5	1	5	1	7	1	7	1	5	1	5	1	3	1	1	1	5	1	5	3	5	3	5	3
28	5	3	1	3	1	5	1	3	3	-1	5	-1	3	-1	5	-1	1	-1	1	-1	1	1	1	-1	3	1	3	1	3	3	3	1
29	5	1	1	3	1	3	1	3	3	-1	3	-3	3	-1	3	-3	1	-1	1	-1	1	-1	1	-1	1	1	1	1	1	3	3	1
30	5	1	3	3	1	3	3	1	1	-3	1	-3	1	-3	1	-3	-1	-3	-1	-3	-3	-3	-3	-3	-1	-1	1	-1	1	1	1	-3
31	7	3	3	5	5	3	3	3	5	1	5	-1	3	-1	3	-1	1	1	1	-1	-1	1	1	-1	3	1	3	1	1	1	5	1
32	5	1	3	3	1	1	1	3	1	-3	3	-3	1	-3	1	-3	-1	-3	-1	-3	-1	-1	-1	-5	1	-1	1	-3	-1	-1	1	-3

FIGURE 72. **Second Repetition of Walsh Transform for the Same Target Used to Produce Figure 70.**

WALS COEFFICIENTS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	50	0	56	4	44	0	44	-2	2	-12	-2	-8	6	-8	6	-8
2	6	-2	2	2	0	0	0	0	0	-6	0	-6	0	-4	0	-4
3	10	2	6	4	6	2	4	4	4	-2	4	-2	4	-2	4	-2
4	6	6	4	6	2	6	2	6	6	2	6	0	6	2	6	0
5	2	2	0	4	0	6	0	4	4	0	4	-2	4	-2	2	-2
6	10	2	6	4	6	4	6	2	4	-2	4	-2	4	-2	4	-2
7	10	2	8	6	6	6	6	6	4	0	6	0	6	0	4	0
8	4	4	4	4	2	6	2	4	4	0	6	0	4	0	6	0
9	4	2	0	4	0	4	0	4	4	0	6	0	4	0	4	-2
10	8	4	6	6	4	4	6	4	4	0	4	0	6	2	6	0
11	8	2	6	4	4	4	4	2	2	0	4	-2	4	0	4	-2
12	4	2	0	4	0	4	0	2	2	-2	2	-2	2	-2	4	-2
13	2	2	0	4	-2	4	-2	2	2	-2	4	0	4	0	4	-2
14	8	2	4	2	2	0	2	0	2	-4	2	-4	2	-2	2	-6
15	6	0	4	2	2	0	2	2	0	-4	0	-4	0	-4	0	-6
16	2	-2	0	0	-2	0	-2	-2	-4	-6	-2	-6	-2	-6	0	-6
17	2	2	0	2	0	2	0	2	4	-2	4	-4	4	-2	4	-4
18	6	0	2	2	2	2	2	2	2	-2	4	-2	4	-2	4	-2
19	2	-2	2	0	2	2	2	0	0	-4	2	-4	0	-4	0	-4
20	2	0	-2	2	-2	0	-2	0	0	-2	0	-2	2	-2	2	-4
21	0	-2	-2	-2	-4	-2	-4	-2	-2	-6	0	-6	-2	-6	0	-6
22	2	-2	-2	-2	-2	-2	-2	-4	-2	-6	-2	-6	-2	-6	-2	-6
23	2	-4	0	0	-2	-2	-2	-2	-2	-6	0	-6	0	-6	-2	-8
24	2	-2	-2	0	-2	0	-2	-2	-4	-6	-2	-6	-4	-8	-2	-8
25	2	2	0	2	0	2	0	2	2	-2	2	-4	2	-4	2	-4
26	4	0	4	0	0	0	0	0	0	-6	0	-4	0	-6	0	-6
27	4	2	4	2	2	4	2	2	2	-2	2	-4	2	-2	2	-4
28	2	0	0	2	-2	0	-2	0	0	-4	0	-4	0	-4	2	-4
29	0	0	0	0	-2	0	0	0	0	-4	2	-4	0	-4	0	-4
30	4	0	2	0	0	0	2	-2	0	-6	0	-6	0	-4	0	-6
31	4	0	2	4	2	4	2	2	2	-4	2	-2	2	-2	2	-4
32	4	0	0	2	-2	2	-2	0	0	-4	2	-4	0	-4	0	-6

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	-6	0	-6	0	-8	0	-10	-2	6	-6	4	-6	10	-4	10	-4
2	-2	-4	-4	-4	-4	-4	-6	-4	-2	-4	-2	-6	0	-4	0	-2
3	0	-2	0	0	-2	0	0	-2	0	0	2	0	2	-2	2	0
4	4	2	2	0	2	0	2	-2	2	4	4	0	4	4	4	2
5	0	-2	0	-2	0	-2	0	-2	0	0	0	0	0	0	0	-2
6	0	0	0	-2	-2	-2	-2	-4	-2	-2	0	0	2	-2	0	-2
7	2	2	2	0	2	0	0	0	4	0	4	0	4	0	4	-2
8	4	2	4	0	2	0	2	0	4	2	4	2	4	2	4	2
9	2	0	2	0	0	2	2	0	2	2	4	2	2	2	4	2
10	2	2	2	2	0	2	0	0	4	4	4	2	6	4	4	2
11	0	0	0	-2	0	0	2	-2	2	0	4	0	2	2	4	0
12	0	0	0	-2	0	-2	0	-4	0	0	2	0	2	0	0	-2
13	0	0	0	-2	0	0	0	-2	2	0	2	0	0	0	2	0
14	-2	-2	0	-4	-2	-4	-4	-4	0	-2	0	-2	0	-2	2	-2
15	-2	-2	-2	-4	-2	-4	-4	-4	0	-4	0	-4	0	-2	0	-4
16	-4	-6	-4	-6	-6	-6	-4	-6	-4	-6	-2	-6	-4	-4	-4	-4
17	0	0	0	-2	0	-2	2	-2	0	0	0	-2	0	0	0	0
18	0	0	0	-2	-2	0	0	-2	2	0	2	-2	2	0	2	0
19	0	-2	0	-2	-2	-2	-2	-4	0	-2	0	-4	0	-2	0	-2
20	0	-2	0	-2	0	-2	0	-2	0	0	2	-2	0	0	2	-2
21	-4	-6	-4	-6	-4	-6	-4	-4	-2	-4	-2	-4	-2	-4	-2	-4
22	-6	-6	-6	-6	-6	-6	-6	-6	-4	-4	0	-4	-2	-4	-2	-4
23	-4	-6	-6	-6	-6	-6	-6	-6	-4	-6	-4	-6	-4	-6	-2	-6
24	-6	-6	-6	-8	-6	-8	-6	-10	-4	-6	-6	-6	-6	-6	-4	-6
25	-2	-4	-2	-4	-4	-2	-2	-4	-2	-2	-2	-4	-2	-2	0	-4
26	-2	-4	-4	-4	-6	-6	-6	-6	-4	-4	-2	-4	-2	-6	-2	-6
27	0	0	0	-2	-2	-2	0	-4	0	0	0	-2	0	-2	0	-2
28	0	-2	-2	-4	-2	-4	-2	-4	0	-2	0	-4	0	-4	-2	-4
29	-2	-2	-2	-4	-2	-4	-4	-4	-2	-2	-2	-2	-2	-2	-2	-4
30	-4	-4	-4	-4	-4	-4	-4	-6	-4	-4	0	-4	-2	-4	0	-4
31	0	-2	0	-2	0	-2	-2	-4	0	0	0	-2	0	-2	2	-2
32	-2	-6	-2	-4	-2	-4	-2	-4	-2	-2	0	-4	-2	-2	-2	-4

FIGURE 73. Third Repetition of Walsh Transform for the Same Target Used to Produce Figure 70.

CONCLUSIONS

1. The concept of direct transforms using discreate function technology has a high potential for cartographic feature extraction.

2. An electro–optical system employing a plasma discharge device as a light source proved to be capable for producing Walsh transforms of topographic features.

3. The system can produce two–dimensional, 512 by 512 (262,144) Walsh functions and a same number of associated Walsh coefficients in about 14 seconds.

4. In general, the signal signatures of the Walsh spectrum are less complicated than the spatial signal signature.

5. The significant spectral components are distributed among a few low order Walsh transform coefficients. Further, each transform pattern is unique in itself, and can be distinguished easily from the rest.

6. A simple decision procedure, either in hardware or software, can be implemented to detect and recognize the above selected cartographic features automatically.

7. The plasma filter of PISA has not yet reached the technical maturity to be implemented in high reliability equipment.

8. The most attractive feature of the plasma tube is that it constitutes a large number of parallel–accessible electrodes in two–dimensions, thus providing the possibility of high speed electronic scanning with discrete funtions.

APPENDIX

```
.3    : 02  UN @406308
&WCOEF T=00003 IS ON CR00010 USING 00015 BLKS R=0000

FTN4,L
C************PROGRAM "WCOEF"--REV 02/05/79**************************
C
C             PROGRAM TO INPUT WALSH COEFFICIENTS FROM
C             THE PROTOTYPE IMAGE SPECTRUM ANALYZER (PISA)
C             AND DISPLAY THEM ON THE TEKTRONIX 601
C
C
      PROGRAM WCOEF
      DIMENSION IDISP(1026),IVID(1026),LABEL(10),INPUT(14)
      DIMENSION LABL2(10),LABL3(10)
      DIMENSION IBUF(1026),ICOEF(1026)
      DATA LABEL/2HWA,2HLS,2H  ,2HCO,2HEF,2HFI,2HCI,2HEN,2HTS,2H  /
      DATA LABL2/2HPI,2HSA,2H I,2HNP,2HUT,5*2H  /
      DATA LABL3/2HDI,2HSP,2HLA,2HY ,2HOU,2HTP,2HUT,3*2H  /
      DATA INPUT/2HIC,2HDM,2HPC,2HTR,2HLU,2HTH,2HIT,2HPI,2HPD,2HDS /
C
C
      ITHRS=0
      LU=2
      NCHR=72
      WRITE(2,10)
10    FORMAT("DISPLAY CHANNEL?")
      READ(1,15)ISC1
      WRITE(2,16)
16    FORMAT("INPUT CHANNEL?")
      READ(1,15)ISC2
15    FORMAT(K2)
17    WRITE(2,20)
20    FORMAT("DISPLAY DIMENSION?")
      GO TO 200
C
C     INPUT LOOPER
C
C            IC--INPUT AND PROCESS COEFFICIENTS
C            PI--PRINT RAW PISA INPUT
C            DM--SET DISPLAY DIMENSION
C            PC--PRINT COEFFICIENTS
C            PD--PRINT DISPLAY BUFFER
C            LU--INPUT LIST LU
C            IT--INPUT THRESHOLD VALUE
C            TH--THRESHOLD DATA WITHOUT INPUT
C            DS--DISPLAY COEFFICIENTS
C            TR--TERMINATE PROGRAM
C
30    WRITE(2,40)
40    FORMAT("??")
      READ(1,50)IN
50    FORMAT(A2)
      IF (IN.EQ.INPUT(8))CALL MATOT(IBUF,LABL2,N,N,3,LU,NCHR)
      IF (IN.EQ.INPUT(1))GO TO 100
      IF (IN.EQ.INPUT(2))GO TO 200
      IF (IN.EQ.INPUT(3))CALL MATOT(ICOEF,LABEL,N,N,2,LU,NCHR)
      IF (IN.EQ.INPUT(4))STOP
      IF (IN.EQ.INPUT(5))GO TO 400
      IF (IN.EQ.INPUT(7))READ(1,*)ITHRS
      IF (IN.EQ.INPUT(6))GO TO 500
```

```
      IF (IN.EQ.INPUT(9))CALL MATOT(IVID,LABL3,N,N,2,LU,NCHR)
      IF (IN.EQ.INPUT(10))CALL DSPLA(IDISP,NELS,ISC1)
      GO TO 30
C
C     THIS SECTION PERFORMS THE FOLLOWING OPERATIONS
C
C         INPUTS N X N COEFFICIENTS INTO "IBUF" WITH "PISA"
C         COMPUTES A00 AS TWICE THE AVG. OF ALL COEFFICIENTS
C         SCALES COEFFICIENTS IN THE RANGE, 0-99
C         COMPUTES ACTUALL COEFFICIENTS BY SUBTRACTING 1/2 A00
C         THRESHOLDS COEFFICIENTS AND DSIPLAY ACCORDING TO "ITHRS"
C         SCALES COEFFICIENTS FOR VIDEO DISPLAY
C
100   CALL PISA(IBUF,N,ISC2)
      A00=0.0
      DO 140 I=2,NELS
140   A00=A00+IBUF(I)
      IBUF=2*A00/NELS
      IBUF(NELS+1)=0
      IBUF(NELS+2)=1023
500   I=NELS+2
      CALL ISCAL(IBUF,ICOEF,I,0,99)
      DO 110 I=2,NELS
110   ICOEF(I)=2*ICOEF(I)-ICOEF
      IVID(NELS+1)=0
      IVID(NELS+2)=99
      DO 120 I=1,NELS
      IF (IABS(ICOEF(I)).GE.ITHRS)GO TO 130
      ICOEF(I)=0
      IVID(I)=0
      GO TO 120
130   IVID(I)=IABS(ICOEF(I))
120   CONTINUE
      I=NELS+2
      CALL ISCAL(IVID,IVID,I,0,15)
      CALL DSGEN(IDISP,IVID,0)
      GO TO 30
C
C     THIS SECTION INPUTS THE NEW COEFFICIENT MATRIX
C     DIMENSION AND GENERATES THE X-Y DISPLAY COORDINATES
C     WITH SUBROUTINE "DSGEN"
C
200   READ(1,*)N
      NELS=N*N
      IF (NELS.GT.1024)GO TO 17
      ICBIT=IPWR2(N)
      CALL DSGEN(IDISP,IVID,-3,ICBIT,6,N,4)
      GO TO 30
C
C
400   READ(1,15)LU
      NCHR=72
      IF (LU.EQ.6)NCHR=132
      GO TO 30
      END
      END$
```